User Guide of 2-bit and 4-bit Test Cards

This user guide is for all of my PC test cards including the 2bits and 4bits cards for desktop and laptop PCs!

- All my system hardware test cards will perform the self tests in advance to the testing of the PC system hardware errors, for example, the code "FFFF" is a self test code.
- All test cards will not short-circuited themselves and the mainboards if users insert the cards into the wrong slots on the mainboards. The onboard speaker allows more advanced PC systems hardware testing with audio output.

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A. Installations and the uses of the test cards

The following pictures are the picutres of the different PC test cards, the model numbers and the board layout designs are subjected to change without notification), you are welcomed to send me email if you do not know which test card on this manual is compatible to the one you are having on hand!

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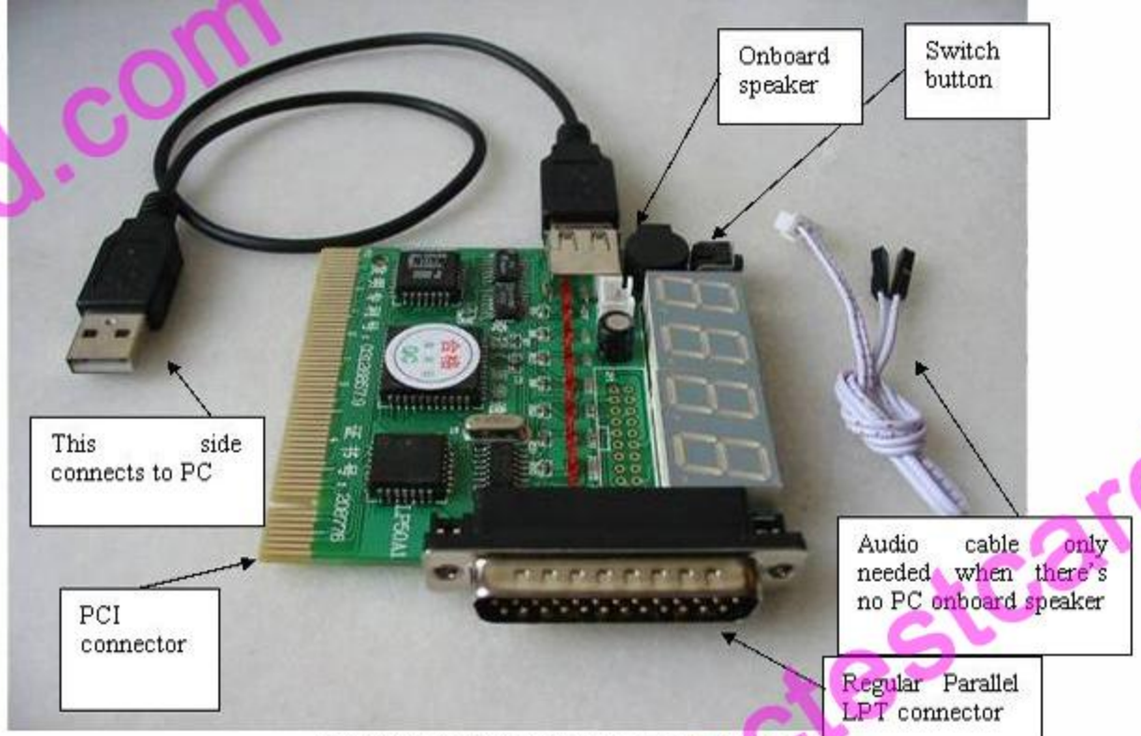

Parallel / PCI Combo Analyzer Test Card

Installation of this Parallel USB / PCI Combo Test card:

(2) ways to use this test card (either way, please remember to power OFF the PC before installation)

(a) open the desktop PC case, install this card on the PCI slot and power on the PC .

(b) no need to open the PC case, connect both Parallel/LPT and USB connectors to the PC.

Uses:

After connecting the card to the PC and powered on the PC, follow the 2 flowcharts in this manual to do the testing by pressing the function switch button next to the display unit.

Then refer the stop code on the display unit to the "error codes section" in this manual for the descriptions.

Parallel / miniPCI Combo Test Card

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Installation of this Parallel USB / miniPCI Combo Test card:

(2) ways to use this test card (either way, please remember to power OFF the PC before installation)

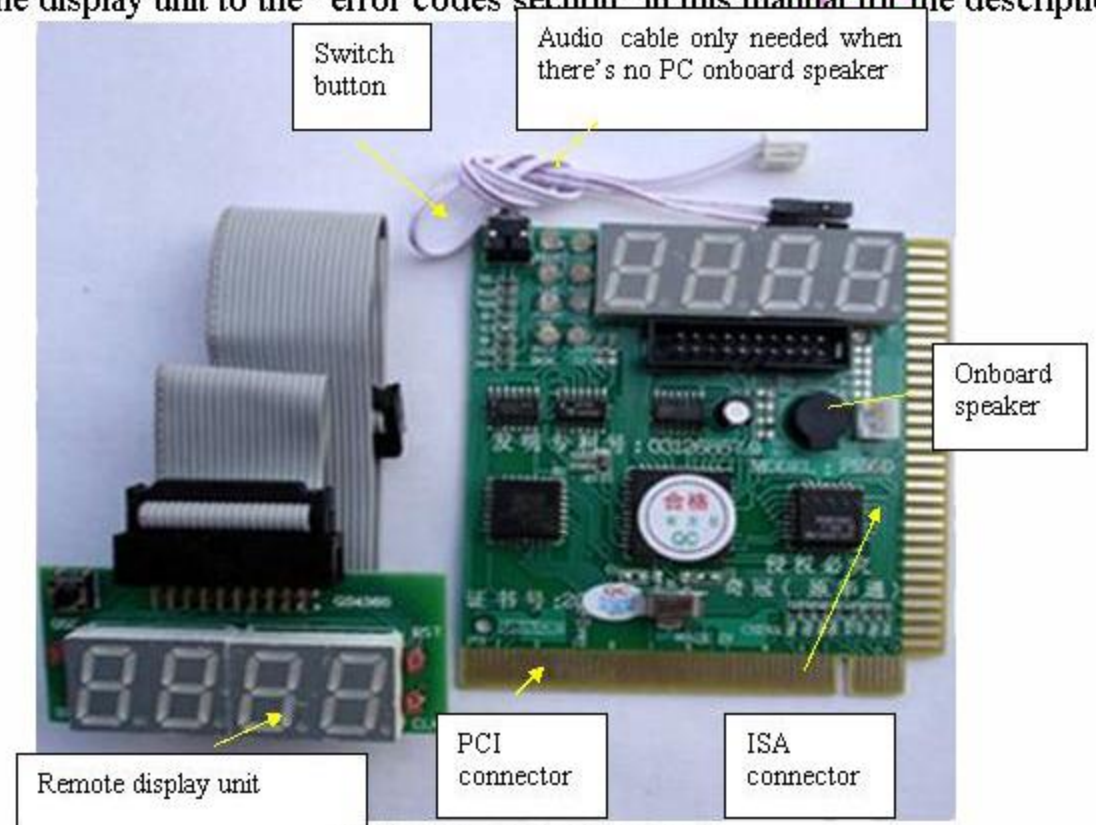
(a) no need to open the PC case, connect both Parallel/LPT and USB connectors to the PC (Works on both laptop and desktop PC Parallel/LPT USB interface).

(b) open the laptop miniPCI compartment that usually locates at the bottom of the laptop next to the system RAM memory compartment, install on the miniPCI connector (not for PCI-e mini card connection), you may need to remove the existing miniPCI device such as wireless module on the laptop first.

Uses:

After connecting the card to the PC and powered on the PC, follow the 2 flowcharts in this manual to do the testing by pressing the switch button next to the display unit.

Then refer the stop code on the display unit to the "error codes section" in this manual for the descriptions.



DESKTOP 8digit Test Card

Installation of this DESKTOP 8digit PCI / ISA Test card:

(2) ways to use this test card (either way, please remember to power OFF the PC before installation)

(a) open the desktop PC case, install on the ISA slot

(b) open the desktop PC case, install on the PCI slot

Uses:

After connecting the card to the PC and powered on the PC, follow the 2 flowcharts in this manual to do the testing by pressing the switch button next to the display unit.

Then refer the stop code on the display unit to the "error codes section" in this manual for the descriptions.

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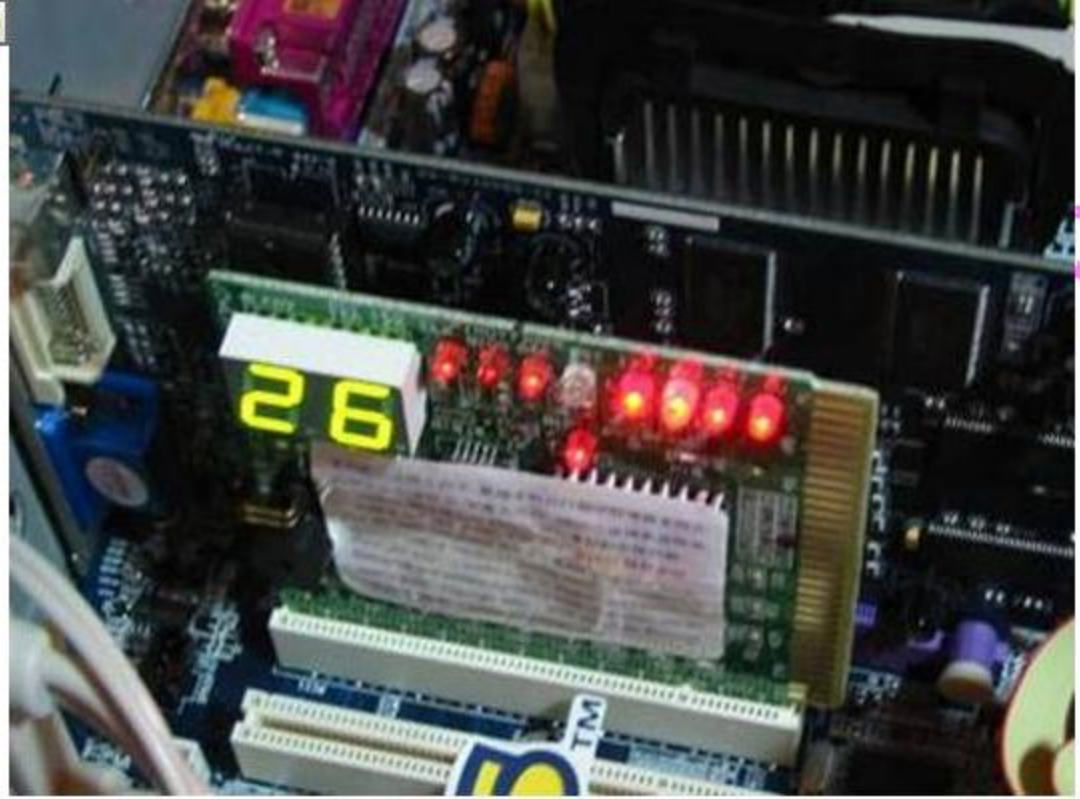

Desktop 2digit Test Card

Installation of this New Desktop 2digit PCI / ISA diagnostic Test card:

(2) ways to use this test card (either way, Please remember to power OFF the PC before installation)

(a) open the desktop PC case, install on the ISA slot

(b) open the desktop PC case, install on the PCI slot

Uses:

After installation and powering on the PC, please wait for this card to do the testing automatically and refer the stop code shown on the display unit to the manual for the same code descriptions. No need to press any button to do the testing.

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B. Descriptions of LED Lights (if LEDs are available)

LED	Type	Description
RUN	Bus pulse	ON and sparkles if mainboard is operational; OFF if not.
CLK	Main Bus clock	Lights when the power is applied to the empty board (even without CPU), otherwise the main board bus clock signal is not functioning.
BIOS	Basic input/output signal	LED that turn on and off when the board is powered on, as CPU is reading to BIOS.
IRDY	Major devices are ready	LED that turn on and off when there is an IRDY signal.
OSC	Oscillation	Lights when the board is powered on, or else the crystal oscillation circuit is broken, and thus no OSC signal.
FRAME	Frame periods	Lights all the time. Turn on and off only when there is a circular frame message.
RST	Reset	Lights for 0.5-second when you press the power switch or the reset switch. If it lit all the time, check the following: make sure the reset pin is plugged properly, or the reset circuit is broken.
12V	Power	Lights once the board is powered on, if it is not lit, that means the short circuit occurs on motherboard, or Power supply unit voltage can't up to 12V.
-12V	Power	The same above "12V"
5V	Power	The same as above "12V"
-5V	Power	The same as above "12V" (-5V is output only applicable to ISA slot)
3v3	Power supply 3.3-volt positive	There is proper voltage of 3.3v of the PCI slot and miniPCI.. The LED should ON all on the time as long as the power is on; but sometimes this LED maybe OFF indicating that there is no 3.3v in the PCI or miniPCI slot of some mainboards or there is open circuit.

C. Alphanumeric displays on the 4-bit (4digits and 8digits) TEST card

Users can ignore the following table of TEST card initialization steps and the self testing stages!

word/NUM	Descriptions
0 - - -	Start automatic diagnosis process
1 - - -	The first display symbol of main menu ,then enter code consulting function
2 - - -	The second display symbol of main menu , then display the reference speed of system bus, higher the number, faster the bus speed.
3 - - -	The third display symbol of main menu ,display the version number of the TEST card.
4 - - -	The fourth display symbol of main menu, start the TEST card self test and display from "0000"、"1111" to "FFFF"
5 - - -	The 5th display symbol, the end of the TEST card self-test. Never mind what number it displays, the TEST card self test process passed.
- P C I	It indicates that the slot you insert the card is PCI slot, and wait for you to consult the next code by pressing function switch.
- I S A	It indicates that the slot that you insert the card is ISA slot. And wait for you to consult the next code by pressing function switch.
— — — P	This is forward testing. The first two bits indicate the hexadecimal error code .The last two bits indicate the ordinal number of the code.
P — — —	This is backward testing. The first two bits indicates the hexadecimal error code, the last two bits indicates the ordinal number of the code.
- E n d	Code 0 till Code 47 represents different results depends on different hardware and BIOs being tested. This symbol display " — E n d " indicating that the test has been done for the forward cycle testing (from beginning code 0 to last code 47). Press and hold the onboard function switch for about 0.8 second, the TEST card will enter the backward consulting mode and display "P- - -", In the next display, the first two-bit code indicates the 47th TEST code (not number 47 but the tested result code at the position of 47), the last two-bit code(the number "47" this time) indicates the code being tested is for code position 47; if press and hold the function switch for about 0.8 second twice, it will exit the code consulting mode and enter the second function of main menu, at the same time displayed "2- - -", then display the reference speed of PCI/ISA bus in decimal in half a second.
E n d -	The first code (ordinal number limit : 0-47) backward consulting is displayed; Press and hold the function switch for 0.8 second, then enter the forward consulting mode and display"- - -P", after half a second, the code is displayed, the first two-bit code indicates the results at the position of zero code; the last two-bit code ("00") indicates the ordinal number of the code. If press and hold the function switch for about 0.8 second twice, it will exit the code consulting and enter the second function of main menu, at the same time displayed"2- - - ", then display the reference speed of PCI/ISA bus in decimal in half a second. **Again, users can ignore the above TEST card initialization and self test process table!**

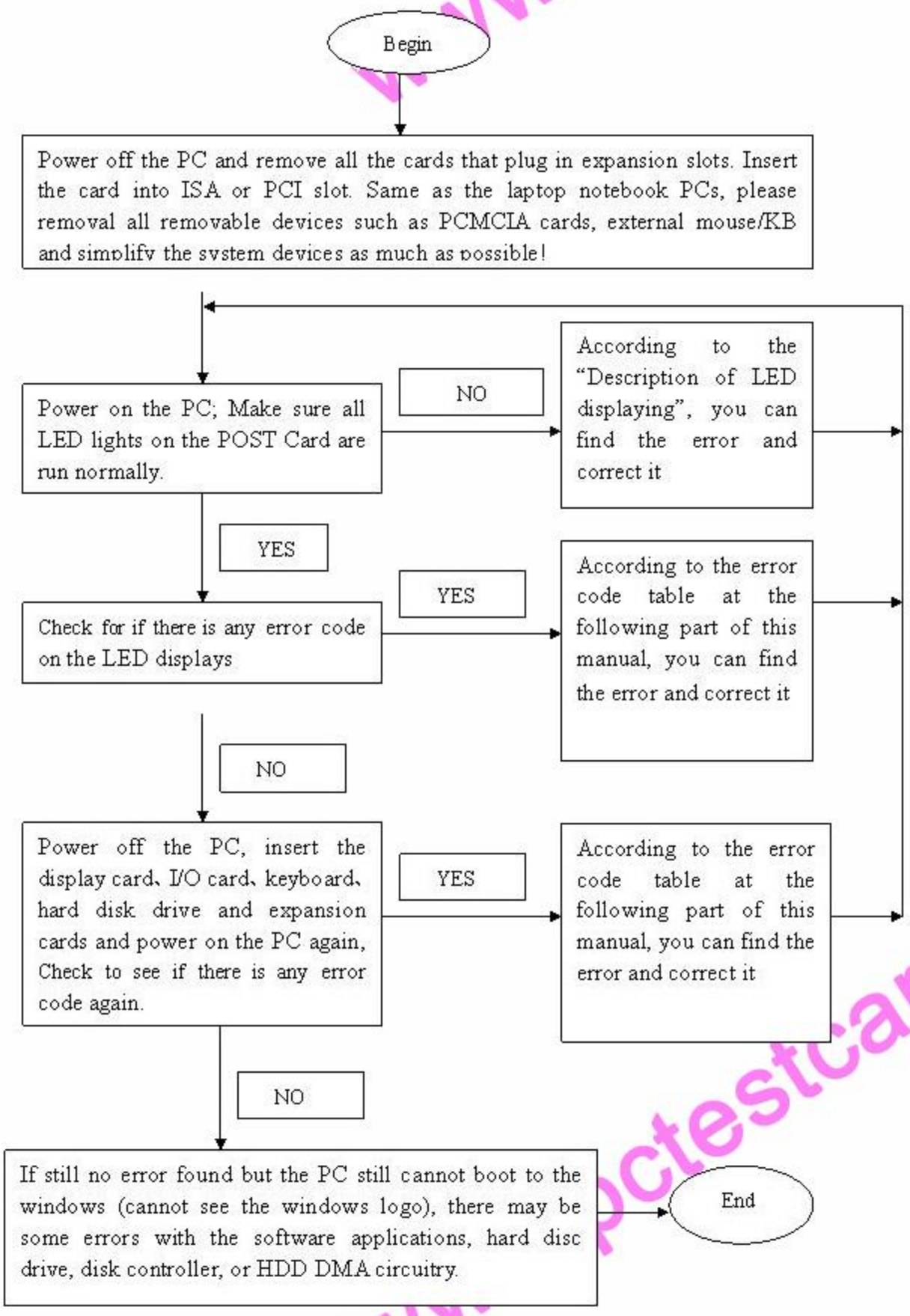
D. Facts

1. Four-bit code can be divided into two sets of two-bit codes .The left set is made of the thousands digit and the hundreds digit; The other set on the right is made of the tens digit and units digit. The left 2 digit tells which component on the man inboard is faulty, while the right 2 digit tells the number count of the component on the testing list that pass the test!
   So, you just need to pay attention on the LEFT 2digit of the display unit. They tells you the error code that you can refer to the following part of the manual for the same code descriptions!

2. For the different BIOS (such as AMI, Award, Phoenix), same code on the TEST card means differently, so please make sure which kind of BIOS you are testing. You can consult the PC user's manual, obtain the Bios info from the motherboard or view the Bios info from the main board POST screen during the PC powering on process.

3. Try use different PCI slots and/or ISA slots if you cannot see the error codes from the test cards display units or consult the frequently-asked section at the end of this manual.

E. Flowchart A



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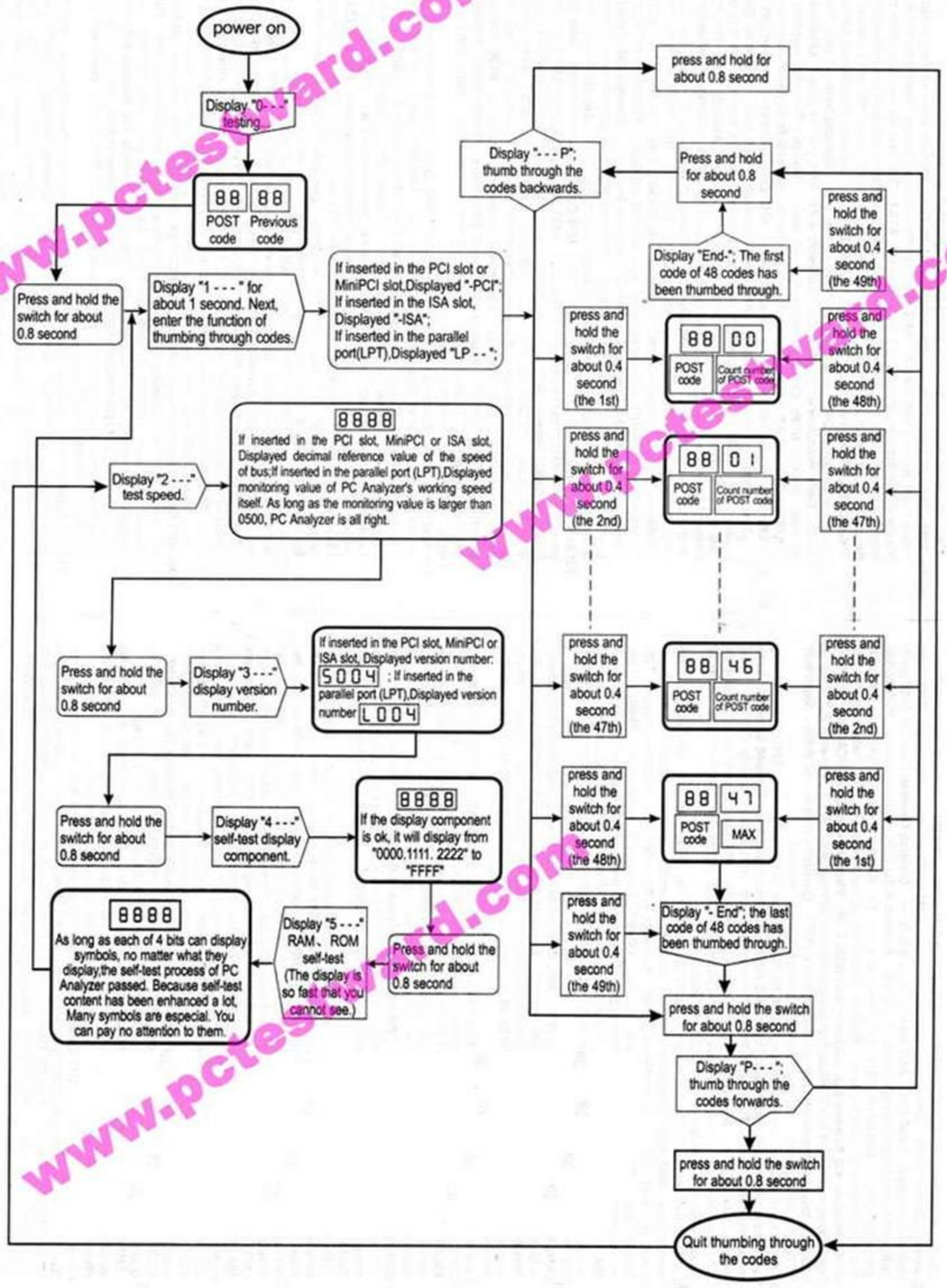
FlowChart B



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F. Meanings of POST codes

00: AMI Color: Control to Int 19 boot loader. **AMI Ez-Flex:** Call to Interrupt 19 for boot loader. **AMI Plus:** Control to Interrupt 19. **AMI Win:** Control to Int 19 boot loader. **AST:** Reserved; Beep and halt if error occurs. **Chips & Tech:** Error in POS register. **Compaq General:** Initialize flags, MSW, IDTLIN. **Compaq Video:** Entry into video ROM. **IBM:** CPU tested with pattern FFAA0055. **Mr. Version 3.4x:** Cold start. **Zenith:** Start of Slush test.

01: ALR: CPU register test in progress. **AMI Color:** CPU flag test. **AMI Ez-Flex:** NMI disabled; Start CPU flag test. **AMI Plus:** NMI disabled (Bit 7 of I/O port 70h). **AMI Win:** Disable NMI. **AST:** Test CPU registers. **AWARD Elite:** Processor test; Processor status verification. **AWARD ISA/EISA:** CPU flags tested; Processor test #1. **AWARD Version 6.0:** Expand the X group codes located in physical memory address 1000: 0. **Chips & Tech:** CPU flag register failed. **Compaq General:** Test alternate adapters. **Compaq Video:** Test alternate adapters. **Dell:** CPU register test in progress. **DTK:** Testing the CPU. **Faraday:** CPU test failed. **IBM:** CPU 32 register tested. **Mr. Version 3.4x:** Initialize KBD controller, Disable CPU cache, Initialize onboard I/O chipset, Test RAM size. **Mylex:** CPU test. **NCR:** Test CPU registers. **Olivetti:** Test CPU. **Phoenix ISA/EISA/MCA v3.07:** CPU register test in progress. **Zenith:** Processor test.

02: ALR: Real-time clock write/read failure. **AMI Color:** Power-on delay. **AMI Ez-Flex:** Power-on delay. **AMI Plus:** 286 register test over. **AMI Win:** Power-on delay. **AST:** Test the 8042 keyboard controller buffer. **AWARD Elite:** Processor test 2; Read/Write and verify all CPU registers. **AWARD ISA/EISA:** CPU registers tested; Processor test #2; Verify all CPU registers except SS, SP, BP with data patterns 00 and FF. **Chips & Tech:** CPU register test failed. **Compaq General:** 8042 received read command. **Compaq Video:** Perform vertical sync tests. **Dell:** CMOS read/write test failed. **Faraday:** BIOS ROM checksum test failed. **HP:** Verify real mode. **IBM:** BIOS ROM checksum tested. **Mr. Version 3.4x:** Disable critical I/O. **Mylex:** DMA page register tested. **NCR:** Verify port 61h. **Olivetti:** Check CMOS shutdown byte. **Phoenix 4.0:** Verify real mode. **Phoenix 4.0 Release 6.0:** Verify real mode. **Phoenix ISA/EISA/MCA v3.07:** CMOS read/write failure. **Phoenix PCI:** If the CPU is in protected mode, turn on gate A20 and pulse the reset line. Forces a shutdown 0. **Quadtel:** Flag test. **Zenith:** cache and CLIO.

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03: ALR: ROM BIOS checksum failure. **AMI Color:** Chipset initialization. **AMI Ez-Flex:** Initialize system chipset. **AMI Plus:** ROM checksum OK. **AMI Win:** Soft reset power-on. **AST:** Test the 8042 keyboard controller reset. **AT&T:** Initialize EISA registers. **AWARD Elite:** Initialize chips; Disable NMI, PIE, AIE, UEI, SQWV. Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers and CMOS shutdown. Initialize DMA controller 0 and 1. Initialize interrupt controllers 0 and 1. **AWARD ISA/EISA:** Initialize DMA, PIC, PIT; Calculate BIOS EPROM and sign on message checksum (fail if not 0). **AWARD PnP:** Initialize EISA registers (EISA BIOS only). **AWARD Version 6.0:** Initial Superio_Early_Init switch. **Chips & Tech:** BIOS ROM checksum failed. **Compaq General:** No response from 8042. **Compaq Video:** Perform horizontal sync tests. **Dell:** BIOS ROM checksum bad. **DTK:** Initialize the 8259 interrupt controller. **Eurosoft 4.71:** DMA page registers tested . **Faraday:** CMOS shutdown byte failed. **HP:** System port 94 enabled and checked. **IBM:** Disable NMI. **Mr. Version 3.4x:** Checksum the BIOS ROM. **Mylex:** DMA page registers tested. **NCR:** Test BIOS ROM checksum. **Olivetti:** Initialize the PIC. **Phoenix 4.0 Release 6.0:** Disable non-maskable interrupt (NMI). **Phoenix ISA/EISA/MCA v3.07:** ROM BIOS checksum failure. **Zenith:** ISP defaults set.

04: Acer: CPU verification; POST start. **ALR:** Programmable internal timer failure (or no video card present). **AMI Color:** Soft/hard reset. **AMI Ez-Flex:** Check keyboard for soft/hard reset. **AMI Plus:** 8259 PIC initialization disabled. **AST:** Verify presence of keyboard and check communication. **AWARD Elite:** Test memory refresh toggle. **AWARD ISA/EISA:** Memory refresh initialized; Test CMOS RAM interface. **Chips & Tech:** DMA controller test failed. **Compaq General:** Look for ROM at E000. **Compaq Video:** Perform static system tests. **Dell:** 8254 programmable interrupt controller failed. **Eurosoft 4.71:** DMA page registers failed. **Faraday:** Testing DMA page register. **HP:** Get processor type. **IBM:** POST registers, port 102 enabled and checked. **Mr. Version 3.4x:** Test page register. **Mylex:** ROM BIOS checksum. **NCR:** Test DMA page registers. **Olivetti:** Test refresh. **Phoenix 4.0:** Get CPU type. **Phoenix 4.0 Release 6.0:** Get CPU type. **Phoenix ISA/EISA/MCA v3.07:** Programmable interval timer failure. **Phoenix PCI:** On cold boot, save the CPU type information value in the CMOS. **Quadtel:** Register test. **Zenith:** Entering protected mode.

05: ALR: DMA initialization failure. **AMI Color:** ROM enable. **AMI Ez-Flex:** Enable ROM. **AMI Plus:** CMOS Interrupt disabled. **AMI Win:** Disable cache. **AST:** Read keyboard input port (WS386SX16). **AT&T:** Keyboard controller setup; enable keyboard interface **AWARD Elite:** Blank video, initialize keyboard; Keyboard controller initialization. **AWARD ISA/EISA:** Keyboard initialization; Initialize NMI, PIE, AIE, UEI, SQWV; Disable video, parity checking and DMA; Math coprocessor reset; Clear all page registers and CMOS RAM shutdown byte; Initialize timers 0, 1, 2 and set EISA timer to a known state; Initialize DMA controllers 0 and 1; Initialize interrupt controllers 0 and 1; Initialize EISA extended registers. **AWARD PnP:** Keyboard controller self-tested. **AWARD Version 6.0:** Blank out screen; Clear CMOS error flag. **Chips & Tech:** System timer IC failed. **Compaq General:** Look for ROM at C800. **Compaq Video:** Perform bug tests. **Dell:** DMA controller initialization failed. **DTK:** Initialize the video board - MCA & CGA. **Eurosoft 4.71:** Keyboard tested. **Faraday:** Testing system timer, programmable interrupt timer. **IBM:** POST registers port 96 enabled and tested. **Mr. Version 3.4x:** Enable A20 gate, issue 8042 keyboard controller self test. **Mylex:** Send keyboard command test. **NCR:** Test timer channel 1. **Olivetti:** Test CMOS/RTC periodic interrupt. **Phoenix ISA/EISA/MCA v3.07:** DMA initialization failure. **Zenith:** Memory SIMM's count.

06: ALR: DMA page register write/read failure. **AMI Color:** ROM BIOS checksum. **AMI Ez-Flex:** ROM BIOS checksum tested. **AMI Plus:** System timer (PIT) counting OK. **AMI Win:** Uncompressed POST code. **AST:** Initialize system board support chipset. **AWARD ISA/EISA:** ROM checksum; Memory refresh tested. **Chips & Tech:** Base 64K RAM failed address test: not installed, misconfigured, or bad addressing. **Compaq General:** Normal CMOS reset code. **Compaq Video:** Perform configuration tests. **Dell:** DMA page-register test failed. **Eurosoft 4.71:** Keyboard test failed. **Faraday:** Testing system refresh. **HP:** Initialize system hardware. **IBM:** CMOS shutdown byte 0F tested. **Mr. Version 3.4x:** Initialize ISA I/O. **Mylex:** Normal CMOS reset code. **NCR:** Test timer channel 2. **Olivetti:** Test timer ratio. **Phoenix 4.0:** Initialize system hardware. **Phoenix 4.0 Release 6.0:** Initialize system hardware. **Phoenix ISA/EISA/MCA v3.07:** DMA page register write/read failure. **Phoenix PCI:** Reset DMA controllers; Disable video; Clear pending interrupts from real time clock; Setup port B register. **Quadtel:** Test CPU register. **Zenith:** Memory controller test.

07: AMI Color: 8042 keyboard controller tested. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Plus:** Channel 0 of 8259 PIC test OK. **AMI Win:** CMOS checksum. **AT&T:** Verifies CMOS basic read/write functionality. **AWARD Elite:** Test CMOS interface and battery. **AWARD ISA/EISA:** Low memory setup; Initialize chipset and test the presence of memory; OEM chipset initialization; Lower 256K of memory cleared; Enable parity checking and test parity in lower 256K memory. **AWARD PnP:** Verify CMOS Read/Write. **AWARD Version 6.0:** Clear 8042 interface; Initialize 8042 self test. **Chips & Tech:** Base 64K RAM failed data test. **Compaq Video:** Perform alternate ROM tests. **Eurosoft 4.71:** Keyboard self-test passed. **Faraday:** testing system refresh. **IBM:** CMOS extended port 74-76 enabled and tested. **Mr. Version**

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3.4x: Warm initialize KBD controller & I/O chipset. **NCR:** Test refresh logic. **Olivetti:** Test first 64KB of RAM. **Phoenix 4.0 Release 6.0:** Disable shadow and execute code from the ROM. **Zenith:** Prepared to test block.

08: Acer: Shutdown condition 0; Shutdown byte 0. **ALR:** RAM-refresh verification failure. **AMI Color:** 8042 keyboard controller tested. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Plus:** DMA channel 2 of delta count test OK. **AMI Win:** CMOS initialization. **AWARD Elite:** Set up low memory; Early chipset initialization, memory presence test, OEM chipset routines, clear low 64K memory, test first 64K memory. **AWARD ISA/EISA:** Setup Interrupt vector table; Initialize the first 120 Interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00-1F according to INT_TBL. **AWARD Version 6.0:** Test special keyboard controller for Winbond 977 series Super I/O chips; Enable keyboard interface. **Chips & Tech:** Interrupt controller failed. **Compaq General:** Initialize 8259,80287. **Compaq Video:** Run color gun off tests. **Dell:** DMA page-register test failed. **Eurosoft 4.71:** Keyboard self-test failed. **Faraday:** Testing lower 128 KB of RAM. **HP:** Initialize chipset with POST values. **IBM:** DMA and page registers tested (ports 2, 18, 1A and 1C). **Mylex:** RAM-refresh test. **Mr. Version 3.4x:** Refresh toggle test. **NCR:** Test base 64KB RAM. **Olivetti:** Test 8042 keyboard controller. **Phoenix 4.0:** Initialize chipset registers with initial POST values. **Phoenix 4.0 Release 6.0:** Initialize chipset with initial POST values. **Phoenix ISA/EISA/MCA v3.07:** RAM refresh verification failure. **Phoenix PCI:** Initialize chipset control registers to power on defaults. **Quadtel:** Initialize chipset registers. **Zenith:** first 1 Mb of RAM tested.

09: ALR: 1st 64KB RAM test in progress. **AMI Color:** 8042 keyboard controller tested. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Plus:** DMA channel 1 of delta count test OK. **AST:** Test BIOS ROM checksum. **AT&T:** Program configuration register for Cyrix CPU according to MODBINable Cyrix Register Table; OEM specific cache initialization. **AWARD Elite:** Early cache initialization; Cyrix CPU specific, CPU and cache initialization. **AWARD ISA/EISA:** Cache; CMOS checksum tested. **AWARD PnP:** OEM specific initialization; Configure Cyrix CPU register. **Chips & Tech:** Unexpected interrupt occurred. **Compaq General:** Reset code in CMOS byte. **Compaq Video:** Run color gun on tests. **Dell:** Starting first-64K RAM test. **Eurosoft 4.71:** 8042 keyboard controller checking links. **Faraday:** Testing video controller. **HP:** Set IN-POST flags. **IBM:** DMA initialized. **Mylex:** First-64K memory test. **Mr. Version 3.4x:** Test DMA master & slave registers. **NCR:** Test 8/16 bit bus conversion logic. **Olivetti:** Test NMI. **Phoenix 4.0:** Set in POST flag. **Phoenix 4.0 Release 6.0:** Set IN POST flag. **Phoenix ISA/EISA/MCA v3.07:** First 64K RAM test in progress. **Zenith:** Checksum OEM ROM.

0A: ALR: 1st 64KB RAM chip or data line multi-bit failure. **AMI Color:** 8042 keyboard controller tested. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Plus:** DMA channel 0 of delta test count OK. **AMI Win:** CMOS initialization for date and time. **AT&T:** Initialize first 32 interrupt vectors; Issue CPUID instruction to identify CPU type. **AWARD Elite:** Set up interrupt vector table; Initialize first 120 interrupt vectors. **AWARD ISA/EISA:** Set interrupt table; Initialize keyboard; Detect keyboard controller. **AWARD PnP:** Issue CPUID instruction; Initialize the first 32 interrupt vectors, initialize Int.'s 33 to 120, power management initialization. **AWARD Version 6.0:** Disable PS/2 mouse interface (optional); Auto detect ports for keyboard & mouse followed by a port & interface swap (optional); Reset keyboard for Winbond 977 series Super I/O chips. **Chips & Tech:** System timer does not interrupt. **Compaq General:** Vector vis 40: 67 reset function. **Compaq Video:** Test video memory. **Dell:** First-64KB RAM IC or data line bad. **Eurosoft 4.71:** 8042 keyboard controller unable to read links. **Faraday:** Testing RAM 128 KB to 640 KB. **HP:** Initialize CPU registers. **IBM:** Memory refresh tested. **Mr. Version 3.4x:** Test first 64KB of base memory. **Mylex:** DMA controller test. **NCR:** Test interrupt mask register A. **Olivetti:** Test 8254 PIT. **Phillips:** DMA page-register R/W bad. **Phoenix 4.0:** Initialize CPU registers. **Phoenix 4.0 Release 6.0:** Initialize CPU registers. **Phoenix ISA/EISA/MCA v3.07:** First 64K RAM chip or data line failure multi-bit. **Phoenix PCI:** Set a bit in the CMOS that indicates POST; used to determine if the current configuration causes the BIOS to hang. If true, default BIOS values set on next POST. **Quadtel:** BIOS ROM checksum.

0B: ALR: 1st 64KB RAM odd/even logic failure. **AMI Color:** 8042 protected mode tested. **AMI Ez-Flex:** 8042 protected mode tested. **AMI Plus:** Parity status cleared (DMA/PIT). **AMI Win:** Initialization before keyboard batch. **AT&T:** Verify RTC; Detect bad battery; Read CMOS data into BIOS stack area; PnP initializations (PnP BIOS only): Assign CSN to PnP ISA card, create resource map from ESCD; Assign I/O and memory for PCI devices (PCI BIOS only). **AWARD Elite:** Test CMOS RAM checksum. **AWARD ISA/EISA:** CMOS checksum; Video interface initialized. **AWARD PnP:** PnP initialization; verify the RTC time, detect bad battery, read the CMOS data into the BIOS stack area, assign I/O and memory for any PCI devices. **Chips & Tech:** CPU still in protected mode. **Compaq General:** Vector vis 40: 67 with E01 function. **Compaq Video:** Check that adapter board is present. **Dell:** First-64KB RAM odd/even logic bad. **Eurosoft 4.71:** RATMOD/DIAG link. **Faraday:** Testing DMA controller #1. **HP:** Enable CPU registers. **IBM:** 8042 keyboard controller buffers tested (ports 61 and 64). **Mr. Version 3.4x:** Test master 8259 mask, test slave 8259 mask. **Mylex:** Initialize DMA controller. **NCR:** Test interrupt mask register B. **Olivetti:** Test port 94h. **Phoenix 4.0 Release 6.0:** Enable CPU cache. **Phoenix ISA/EISA/MCA v3.07:** First 64K

RAM odd/even logic failure.

0C: Acer: BIOS ROM checksum tested. **ALR:** Address line failure 1st 64KB RAM. **AMI Color:** 8042 keyboard controller tested. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Plus:** Refresh and system time check OK (DMA/PIT). **AMI Win:** Batch command to keyboard controller. **AT&T:** Initialize BIOS data area. **AWARD Elite:** Initialize keyboard; Detect the type of keyboard. **AWARD ISA/EISA:** Keyboard initialization; Video memory tested. **AWARD PnP:** Initialization of BIOS data area. **Chips & Tech:** DMA page registers failed. **Compaq General:** Boot reset function. **Dell:** First-64KB address line bad. **Eurosoft 4.71:** Keyboard port 60h tested. **Faraday:** Testing DMA controller #2. **HP:** Initialize cache to POST values. **IBM:** 8042 keyboard controller internal test (port 60). **Mr. Version 3.4x:** Test 8259 slave, initialize interrupt vectors 00-77h, initialize keyboard buffer variables. **Mylex:** Interrupt test. **NCR:** Test 8259 slave, initialize interrupt vectors 00-77h, initialize keyboard buffer variables. **Olivetti:** Test port 103h. **Phoenix 4.0:** Initialize cache to initial POST values. **Phoenix 4.0 Release 6.0:** Initialize caches to initial POST values. **Phoenix ISA/EISA/MCA v3.07:** Address line failure in first 64K RAM. **Phoenix PCI:** Initialize I/O module control registers. **Quadtel:** DMA page register test.

0D: ALR: Parity failure 1st 64KB RAM. **AMI Color:** 8042 keyboard controller tested, CMOS. **AMI Ez-Flex:** CMOS RAM shutdown register tested. **AMI Plus:** Refresh link toggling OK (DMA/PIT). **AMI Win:** Verify batch command. **AST:** Test 8254 programmable interrupt timer registers (13 short beeps). **AT&T:** Program chipsets value; Measure CPU speed for display; Video initialization (If no display, speaker beeps). **AWARD Elite:** Initialize video interface; Detect CPU clock, read CMOS location 14h to find the type of video in use, detect and initialize video adapter. **AWARD ISA/EISA:** Video adapter initialized; OEM specific initializations. **AWARD PnP:** Program some of chipset's value; Measure the CPU for display, initialize the video. **Chips & Tech:** Refresh not occurring. **Compaq General:** Test #2 8254 PIT counter 0. **Dell:** First-64KB parity error. **DTK:** Initialize the 8237 DMA controller. **Eurosoft 4.71:** Keyboard failed port 60h test. **Faraday:** Testing interrupt controller #1. **IBM:** 8042 keyboard controller internal test continued. **Mr. Version 3.4x:** Test timer 0, 8254 channel 0. **Mylex:** Determine RAM size. **NCR:** Test CMOS RAM shutdown byte. **Olivetti:** Test port 102h. **Phoenix ISA/EISA/MCA v3.07:** Parity failure in first 64K RAM.

0E: AMI Color: CMOS checksum tested. **AMI Ez-Flex:** CMOS checksum tested. **AMI Plus:** Refresh period ON/OFF 50% OK. **AMI Win:** Initialize after KB controller batch. **AST:** Test ASIC registers (CLEM only, 14 short beeps). **AT&T:** Initialize APIC (multiprocessor BIOS only); Test video RAM; Show display message. **AWARD Elite:** Test video memory; Write sign-on message to screen, setup shadow RAM. **AWARD PnP:** Initialize APIC (multiprocessor BIOS only); Show startup screen message. **AWARD Version 6.0:** Test F000h segment shadow to see whether it is read/write capable or not. If test fails, keep beeping the speaker. **Chips & Tech:** Keyboard controller not responding. **Compaq General:** Test #2 8254 PIT counter 2. **DTK:** Initialize the DMA 74612 page registers. **Eurosoft 4.71:** Keyboard parameter tested. **Faraday:** Testing interrupt controller #2. **HP:** Initialize I/O component. **IBM:** 8042 keyboard controller self test error. **Mr. Version 3.4x:** Test 8254 channel 2, speaker channel. **Mylex:** Initialize video and verify EGA or VGA checksum. **NCR:** Test CMOS RAM battery power. **Olivetti:** Test port 96h. **Phoenix 4.0:** Initialize I/O. **Phoenix 4.0 Release 6.0:** Initialize I/O component. **Phoenix ISA/EISA/MCA v3.07:** Fail-safe timer failure. **Phoenix PCI:** External CPU caches initialized; Cache registers set to default values. **Quadtel:** 8254 programmable interrupt timer test.

0F: AMI Color: CMOS initialization. **AMI Ez-Flex:** CMOS initialization. **AMI Win:** Write KB command byte. **AST:** Test CMOS RAM shutdown byte (15 short beeps). **AT&T:** DMA channel 0 test. **AWARD Elite:** Test DMA controller 0; BIOS checksum test, keyboard detect and initialization. **AWARD ISA/EISA:** DMA channel 0 tested with AA, 55, FF, 00 bit patterns **AWARD PnP:** DMA channel 0 tested. **Chips & Tech:** Could not enter protected mode. **Compaq General:** Warm boot. **Eurosoft 4.71:** Keyboard parameter test failed. **Faraday:** Testing control port. **HP:** Initialize local IDE bus. **IBM:** Memory sized and setup. **NCR:** Test CMOS RAM checksum. **Olivetti:** Test port 107h. **Phoenix 4.0 Release 6.0:** Initialize the local bus IDE. **Phoenix ISA/EISA/MCA v3.07:** Software NMI post failure.

10: Acer: CMOS ROM shutdown byte tested. **ALR:** bit 0 64KB RAM failure. **AMI Color:** CMOS/RTC status OK. **AMI Ez-Flex:** CMOS/RTC status OK. **AMI Plus:** About to start 64K memory. **AMI Win:** Pin 23/24 block/unblock command. **AST:** Test DMA controller 0 registers. **AT&T:** DMA channel 1 test. **AWARD Elite:** Test DMA controller 1. **AWARD ISA/EISA:** DMA channel 1 tested with AA, 55, FF, 00 bit patterns **AWARD PnP:** DMA channel 1 tested. **AWARD Version 6.0:** Auto detect flash type to load appropriate flash read/write codes into the run time area in F000 for ESCD & DMI support. **Chips & Tech:** GDT or IDT failed, Keyboard controller failed. **Compaq General:** PPI disabled, test 8254 PIT 0 and 1. **Compaq Video:** Error...illegal configuration. **Dell:** Bit 0 bad in first 64KB. **Eurosoft 4.71:** Keyboard command byte read. **Faraday:** Testing parity. **HP:** Initialize power management. **IBM:** First 512K base memory tested. **Mr. Version 3.4x:** Turn on monitor, show error messages. **Mylex:** Search for monochrome card. **NCR:** Test CPU protected mode. **Olivetti:** Blank the display. **Phillips:** CMOS RAM R/W error. **Phoenix 4.0:** Initialize power management. **Phoenix 4.0 Release 6.0:** initialize power management. **Phoenix**

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ISA/EISA/MCA v3.07: Bit 0 first 64K RAM failure. **Phoenix PCI:** Verify response from 8742 keyboard controller. **Quadtel:** 8254 programmable interrupt timer initialization. **Zenith:** Lao flash ROM checks.

11: ALR: bit 1 64KB RAM failure. **AMI Color:** DMA/PIC disable. **AMI Ez-Flex:** Disable DMA and PIC. **AMI Plus:** Address line tested OK. **AMI Win:** Check for <INS> key command. **AST:** Test DMA controller 1 registers. **AT&T:** DMA page registers test. **AWARD Elite:** Test DMA page registers. **AWARD ISA/EISA:** DMA page register tested. **AWARD PnP:** DMA page registers tested. **Chips & Tech:** LDT register failed, Keyboard controller failed. **Compaq General:** Initialize (blast) VDU controller. **Dell:** Bit 1 bad in first 64KB. **Eurosoft 4.71:** Keyboard command byte failed read. **Faraday:** Testing CMOS RAM checksum. **HP:** Load alternate registers. **IBM:** Base memory error, system halted. **Landmark:** CPU register or logic error. **Mr. Version 3.4x:** Read and checksum the CMOS. **Mylex:** Search for color card. **NCR:** Test video configuration. **Olivetti:** Check the keyboard. **Phillips:** System BIOS ROM checksum error. **Phoenix 4.0:** Load alternate registers with initial POST values. **Phoenix 4.0 Release 6.0:** Load alternate registers with initial POST values. **Phoenix ISA/EISA/MCA v3.07:** Bit 1 first 64K RAM failure. **SuperSoft:** CPU register or logic error. **Zenith:** F000 ROM checks.

12: ALR: bit 2 64KB RAM failure. **AMI Color:** DMA/PIC initialization. **AMI Ez-Flex:** Video display disabled. **AMI Plus:** 64K base memory tested OK. **AMI Win:** DMA/PIC disable. **AST:** Test DMA page registers (EGA.VGA vertical retrace failed). **AWARD Version 6.0:** Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real time clock power status and then check for override. **Chips & Tech:** Task register failed, Keyboard controller failed. **Compaq General:** Clear screen; turn ON video. **Dell:** Bit 2 bad in first 64KB. **DTK:** Test the 8042 keyboard controller. **Eurosoft 4.71:** Keyboard command byte read OK. **Faraday:** Testing for manufacturing-mode jumper. **HP:** Restore CPU control word during warm boot. **IBM:** Protected mode instructions tested; Keyboard commands tested. **Landmark:** ROM POST A checksum error. **Mr. Version 3.4x:** Call video ROM initialization routines. **Mylex:** Word-splitter and byte-shifter test. **NCR:** Initialize and test primary video controller. **Olivetti:** Test CMOS RAM battery. **Phillips:** Timer A error. **Phoenix 4.0:** Jump to User Patch 0. **Phoenix 4.0 Release 6.0:** Restore CPU control word during warm boot. **Phoenix ISA/EISA/MCA v3.07:** Bit 2 first 64K RAM failure. **Phoenix PCI:** Verify response from 8742 keyboard controller. **Quadtel:** 8237 DMA controller test. **SuperSoft:** ROM POST A checksum error. **Zenith:** Aurora video ROM.

13: ALR: bit 3 64KB RAM failure. **AMI Color:** Chipset/memory initialization. **AMI Ez-Flex:** Chipset and memory initialized. **AMI Plus:** Interrupt vectors initialized. **AMI Win:** Chipset initialization. **AST:** EGA/VGA RAM test failed. **Chips & Tech:** LSL instruction failed, keyboard controller failed. **Compaq General:** Test timer 0. **Dell:** Bit 3 bad in first 64KB. **Eurosoft 4.71:** Keyboard command byte corrupt. **Faraday:** Configure interrupt vectors. **HP:** Initialize PCI bus mastering devices. **IBM:** PIC Interrupt controller 1 (master) tested. **Landmark:** ROM POST B checksum error. **Mr. Version 3.4x:** Set 8 Mhz AT-bus. **Mylex:** Keyboard tested. **NCR:** Primary video error. **Olivetti:** Verify CMOS RAM checksum. **Phillips:** DMA controller A error. **Phoenix 4.0 Release 6.0:** Initialize PCI bus mastering devices. **Phoenix ISA/EISA/MCA v3.07:** Bit 3 first 64K RAM failure. **SuperSoft:** ROM B POST checksum error. **Zenith:** F000 ROM slushed.

14: Acer: DMA controller tested. **ALR:** bit 4 64KB RAM failure. **AMI Color:** 8254 PIT timer tested. **AMI Ez-Flex:** 8254 PIT tested. **AMI Plus:** 8042 keyboard controller tested. **AMI Win:** 8254 timer test. **AST:** Test memory refresh toggle (EGA/VGA CRT registers failed). **AT&T:** Test 8254 timer 0 counter 2. **AWARD Elite:** Test timer counter 2. **AWARD ISA/EISA:** Timer chip 8254 PIT timer 0 counter 2 tested. **AWARD PnP:** Test 8254 timer 0 counter 2. **AWARD Version 6.0:** Program chipset default values into chipset. Chipset default values are MODBINABLE by OEM customers. **Chips & Tech:** LAR register failed, Keyboard controller failed. **Compaq General:** Disable RTC interrupts. **Dell:** Bit 4 bad in first 64KB. **Eurosoft 4.71:** RAM-refresh toggle switch. **Faraday:** Testing the keyboard. **HP:** Initialize keyboard controller. **IBM:** PIC Interrupt controller 2 (slave) tested. **Landmark:** 8253 programmable interrupt timer channel 0. **Mr. Version 3.4x:** Size and test memory, stuck NMI check. **Mylex:** RAM tested. **NCR:** Test disabling speed stretch at port 69h. **Olivetti:** Verify extended CMOS RAM checksum. **Phillips:** DMA controller B error. **Phoenix 4.0:** Initialize keyboard controller. **Phoenix 4.0 Release 6.0:** Initialize keyboard controller. **Phoenix ISA/EISA/MCA v3.07:** Bit 4 first 64K RAM failure. **Phoenix PCI:** Verify response from 8742 keyboard controller. **Quadtel:** 8237 DMA controller initialization. **SuperSoft:** 8254 programmable interrupt timer channel 0 error. **Zenith:** SEP initialized.

15: ALR: Bit 5 64KB RAM failure. **AMI Color:** 8254 PIT channel 2 timer tested. **AMI Ez-Flex:** PIT channel 2 tested. **AMI Plus:** CMOS Read/Write test OK. **AST:** Test base 64KB memory. **AT&T:** Test 8259 interrupt mask bits for channel 1. **AWARD Elite:** Test 8259-1 mask bits. **AWARD ISA/EISA:** Verify 8259 PIC channel 1. **AWARD PnP:** Test 8259 interrupt mask bit for channel 1. **Chips & Tech:** VERR/VERW failed, Keyboard controller failed. **Compaq General:** Check battery power. **Dell:** Bit 5 bad in first 64KB. **Eurosoft 4.71:** RAM-refresh clock not correct. **Faraday:** Configuring parallel ports. **IBM:** Initialize 120 Interrupt vectors. **Landmark:** 8253 programmable interrupt timer channel 1. **Mr. Version 3.4x:** No

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keyboard and power on, retry keyboard initialization. **Mylex:** System timer tested. **NCR:** Start refresh timer 1. **Olivetti:** Initialize system board and adapter. **Phillips:** Memory refresh error. **Phoenix ISA/EISA/MCA v3.07:** Bit 5 first 64K RAM failure. **SuperSoft:** 8254 programmable interrupt timer channel 1 error. **Zenith:** Language slushed.

16: ALR: bit 6 64KB RAM failure. **AMI Color:** 8254 PIT channel 1 timer tested. **AMI Ez-Flex:** PIT channel 1 tested. **AMI Plus:** CMOS checksum/battery tested. **AST:** Set interrupt vectors in base memory. **AT&T:** Test 8259 interrupt mask bits for channel 2. **AWARD Elite:** Test 8259-2 mask bits. **AWARD ISA/EISA:** Verify 8259 PIC channel 2. **AWARD PnP:** Test 8259 interrupt mask bit for channel 2. **AWARD Version 6.0:** Initial Early_Init_Onboard_Generator switch. **Chips & Tech:** Keyboard controller gate A20 failed. **Compaq General:** Battery has lost power. **Dell:** Bit 6 bad in first 64KB. **DTK:** Test the DMA 7237 controller and 8254 programmable interrupt timer. **Eurosoft 4.71:** RAM bit test passed. **Faraday:** Configuring serial ports. **HP:** BIOS ROM checksum. **IBM:** Initialize 16 extended vectors. **Landmark:** 8253 programmable interrupt timer channel 2. **Mr. Version 3.4x:** Size and test CPU cache. **Mylex:** Initialize keyboard-controller output port. **NCR:** Enable speed stretch at port 69h. **Olivetti:** Initialize and test RAM. **Phillips:** Keyboard controller error. **Phoenix 4.0:** BIOS ROM checksum. **Phoenix 4.0 Release 6.0:** BIOS ROM checksum. **Phoenix ISA/EISA/MCA v3.07:** Bit 6 first 64K RAM failure. **Phoenix PCI:** Verify BIOS ROM checksums to zero. **Quadtel:** Initialize 8259 programmable interrupt controller; reset math coprocessor. **SuperSoft:** 8254 programmable interrupt timer channel 2 error. **Zenith:** Perform video specific tests.

17: ALR: bit 7 64KB RAM failure. **AMI Color:** 8254 PIT channel 0 timer tested. **AMI Ez-Flex:** PIT channel 0 tested. **AMI Plus:** Monochrome mode set OK (6845). **AST:** Initialize video. **AWARD Elite:** Test stuck 8259 interrupt bits; Test stuck key. **AWARD ISA/EISA:** 8259 PIC stuck bits tested; Turn Interrupt bits off and verify no Interrupt mask register is on. **Chips & Tech:** Exception failed/unexpected exception. **Compaq General:** Clear CMOS Diags. **Dell:** Bit 7 bad in first 64KB. **Eurosoft 4.71:** RAM bit test failed. **Faraday:** Configuring lower 640 KB RAM. **HP:** Initialize cache before memory size. **IBM:** CMOS/RTC tested; CMOS byte 0D tested. **Landmark:** 8237 DMA controller 1 error. **Mr. Version 3.4x:** Test A20 off and on gates. **Mylex:** Keyboard-interrupt test. **NCR:** Clear write protect bit. **Olivetti:** Test protected mode registers. **Phillips:** Keyboard controller error. **Phoenix 4.0 Release 6.0:** Initialize cache before memory autosize. **Phoenix ISA/EISA/MCA v3.07:** Bit 7 first 64K RAM failure. **SuperSoft:** 8237A DMA controller 1 error. **Zenith:** Done slushing.

18: Acer: System timer initialized. **ALR:** bit 8 64KB RAM failure. **AMI Color:** Memory refresh test (PIC). **AMI Ez-Flex:** PIT memory refresh tested. **AMI Plus:** Color (CGA) mode set OK (6845). **AST:** Test display memory. **AWARD Elite:** Test 8259 interrupt functionality. **AWARD ISA/EISA:** 8259 PIC maskable IRQ's tested. **AWARD Version 6.0:** Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686). **Chips & Tech:** Shutdown during memory test. **Compaq General:** Test base memory (First 128K). **Dell:** Bit 8 bad in first 64KB. **Eurosoft 4.71:** RAM parity tested. **Faraday:** Configuring RAM above 1 MB. **HP:** Initialize 8254 timer. **IBM:** CMOS/RTC checksum tested. **Landmark:** 8237 DMA controller 2 error. **Mr. Version 3.4x:** External memory size, stuck NMI check. **NCR:** Write and test interrupt descriptor table. **Olivetti:** Test CMOS RAM shutdown byte. **Phoenix 4.0:** 8254 programmable interrupt timer initialization. **Phoenix 4.0 Release 6.0:** 8254 programmable interrupt timer initialization. **Phoenix ISA/EISA/MCA v3.07:** Bit 8 first 64K RAM failure. **Phoenix PCI:** Initialize all three 8254 programmable interrupt timers. **Quadtel:** 8259 programmable interrupt controller test. **SuperSoft:** 8237A DMA controller 2 error.

19: ALR: bit 9 64KB RAM failure. **AMI Color:** Memory refresh test (PIC). **AMI Ez-Flex:** PIT memory refresh tested. **AMI Plus:** Video ROM search. **AMI Win:** Memory refresh test. **AT&T:** Test 8259 functionality. **AWARD Elite:** Test stuck NMI bits (parity I/O check). **AWARD ISA/EISA:** NMI bit check tested and parity I/O checked. **AWARD PnP:** Test 8259 functionality. **Chips & Tech:** Last used error code. **Compaq General:** Initialize base memory. **Dell:** Bit 9 bad in first 64KB. **Eurosoft 4.71:** RAM parity error. **Faraday:** Configuring keyboard. **IBM:** CMOS/RTC battery tested. **Landmark:** DMA page register error. **Mr. Version 3.4x:** System memory size, stuck NMI check. **NCR:** Verify RAM. **Olivetti:** Test CMOS protected mode. **Phillips:** Keyboard controller error. **Phoenix ISA/EISA/MCA v3.07:** Bit 9 first 64K RAM failure. **SuperSoft:** DMA page registers error.

1A: ALR: bit 10 64KB RAM failure. **AMI Color:** Check 15-microsecond refresh (PIT). **AMI Ez-Flex:** Check 15 microsecond refresh (PIT). **AMI Plus:** Optional video ROM OK. **AWARD Elite:** Benchmark; Display CPU clock. **Chips & Tech:** Copyright checksum error. **Compaq General:** Initialize VDU adapters. **Dell:** Bit 10 bad in first 64KB. **Eurosoft 4.71:** CMOS RAM tested. **Faraday:** Configuring floppy drive. **HP:** Initialize DMA controller. **IBM:** Check for soft or hard reset. **Landmark:** 8042 keyboard controller error. **Mr. Version 3.4x:** Test RTC time. **NCR:** Check 8042 keyboard controller. **Olivetti:** Initialize video adapter ROM scan. **Phoenix 4.0:** 8237 DMA controller initialization. **Phoenix 4.0 Release 6.0:** 8237 DMA controller initialization. **Phoenix ISA/EISA/MCA v3.07:** Bit A first 64K RAM failure. **Phoenix PCI:**

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Initialize DMA command register; Initialize 8 DMA channels. **Quadtel:** Memory refresh test. **SuperSoft:** 8042 parity error detected.

1B: ALR: bit 11 64KB RAM failure. **AMI Color:** Check 30-microsecond refresh (PIT). **AMI Ez-Flex:** Base 64K memory tested. **AMI Plus:** Display memory Read/Write test OK. **AWARD Version 6.0:** Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR. **Chips & Tech:** Shutdown during memory sizing. **Compaq General:** The system ROM. **Dell:** Bit 11 bad in first 64KB. **Eurosoft 4.71:** CMOS RAM test failed. **Faraday:** Configuring hard-disk drive. **IBM:** Protected mode initialization. **Mr. Version 3.4x:** Determine serial ports. **NCR:** Test 64KB shadow RAM. **Olivetti:** Test BIOS ROM checksum. **Phoenix ISA/EISA/MCA v3.07:** Bit B first 64K RAM failure.

1C: Acer: Memory refresh system tested. **ALR:** bit 12 64KB RAM failure. **AMI Plus:** Alternate display memory OK. **Chips & Tech:** Chipset initialization. **Compaq General:** CMOS checksum. **Dell:** Bit 12 bad in first 64KB. **Eurosoft 4.71:** CMOS battery OK. **Faraday:** Configuring game-port adapter. **HP:** Reset PIC. **IBM:** Protected mode stack set, Pointer to end of first 64K set. **Phillips:** Base 64KB RAM error. **Mr. Version 3.4x:** Determine parallel ports. **Olivetti:** Test PIC #1. **Phoenix 4.0:** Reset 8254 programmable interrupt timer. **Phoenix 4.0 Release 6.0:** Reset programmable interrupt controller. **Phoenix ISA/EISA/MCA v3.07:** Bit C first 64K RAM failure. **Phoenix PCI:** Initialize 8259 programmable interrupt controller; ICW4 needed; Cascade and edge triggered mode. **Quadtel:** Base 64K RAM address test.

1D: ALR: bit 13 64KB RAM failure. **AMI Plus:** Video retrace check Ok. **AWARD Version 6.0:** Initial EARLY_PM_INIT switch. **Compaq General:** DMA controller/page registers. **Dell:** Bit 13 bad in first 64KB. **Eurosoft 4.71:** CMOS battery failed. **Faraday:** Testing and initializing math co-processor. **IBM:** Low memory size tested in protected mode. **Mr. Version 3.4x:** Initialize numeric coprocessor. **Olivetti:** Test PIC #2. **Phillips:** Base 64KB RAM parity error. **Phoenix ISA/EISA/MCA v3.07:** Bit D first 64K RAM failure.

1E: Acer: Memory type determined. **ALR:** bit 14 64KB RAM failure. **AMI Plus:** Global byte set for video Ok. **AT&T:** Execute EISA initialization if NVM is good. **AWARD PnP:** If an EISA NVM. **Compaq General:** Test keyboard controller. **Dell:** Bit 14 bad in first 64KB. **Eurosoft 4.71:** CMOS checksum passed. **Faraday:** Checking CMOS real time clock. **IBM:** Memory size information saved. **Mr. Version 3.4x:** Determine floppy diskette drive controllers. **Olivetti:** Initialize interrupt vectors. **Phoenix ISA/EISA/MCA v3.07:** Bit E first 64K RAM failure. **Quadtel:** Base 64K RAM memory test.

1F: ALR: bit 15 64KB RAM failure. **AMI Plus:** Mode set for mono/color OK. **AWARD Elite:** Set EISA mode; If the EISA memory checksum is good then EISA is initialized. If it's not good then ISA tests and clear EISA mode flag. **AWARD ISA/EISA:** CMOS Extension RAM checked for. **AWARD Version 6.0:** Load keyboard matrix (notebook platform). **Compaq General:** Test 286 protected mode. **Dell:** Bit 15 bad in first 64KB. **Eurosoft 4.71:** CMOS checksum failed. **Faraday:** Calculate and verify CMOS RAM checksum. **IBM:** Memory split address setup. **Mr. Version 3.4x:** Determine IDE controllers. **Olivetti:** Test CMOS RAM. **Phillips:** LSI sync missing. **Phoenix ISA/EISA/MCA v3.07:** Bit F first 64K RAM failure.

20: Acer: Base 128K memory tested. **ALR:** Slave DMA-register failure. **AMI Color:** Base 64K memory tested. **AMI Ez-Flex:** Address lines tested. **AMI Plus:** Video test OK. **AMI Win:** Base 64K memory test. **AST:** EISA bus board power on (EISA systems only). **AWARD Elite:** Enable slot 0; System board. **AWARD ISA/EISA:** Slot 0 EISA initialized and enabled. **Compaq General:** Test real and extended memory. **Compaq Video:** Error...no vertical sync present. **Dell:** Slave DMA register bad. **Eurosoft 4.71:** CMOS battery fault bit set. **HP:** Test DRAM refresh. **IBM:** Check for extended memory beyond 64MB. **Mr. Version 3.4x:** Display CMOS configuration changes. **NCR:** Display results of tests to this point. **Olivetti:** Test extended CMOS RAM. **Phoenix 4.0:** Test DRAM refresh. **Phoenix 4.0 Release 6.0:** Test DRAM refresh. **Phoenix ISA/EISA/MCA v3.07:** Slave DMA register failure. **Phoenix PCI:** Test DRAM refresh by polling refresh bit in post B. **Quadtel:** Base 64K RAM test for 386 based systems.

21: ALR: Master DMA-register failure. **AMI Color:** Base 64K memory parity tested. **AMI Ez-Flex:** Base 64K parity memory tested. **AMI Plus:** Video display OK. **AWARD Elite:** Enable slots 1. **AWARD ISA/EISA:** Slot 1 EISA initialized and enabled. **AWARD Version 6.0:** HPM initialization (notebook platform). **Compaq General:** Initialize time-of-day. **Compaq Video:** Error...vertical sync out of range. **Dell:** Master DMA register bad. **Eurosoft 4.71:** Master DMA controller 1 tested / Slave DMA controller 2 tested. **Faraday:** Initialize PROM drivers. **IBM:** Test memory-address bus lines. **Landmark:** Scan 16KB critical RAM error. **Mr. Version 3.4x:** Clear screens. **NCR:** Test DMA controller 1. **Olivetti:** Test CMOS real-time clock. **Phillips:** VRAM register error. **Phoenix ISA/EISA/MCA v3.07:** Master DMA register failure. **SuperSoft:** 16K RAM critical region error.

22: ALR: Master-interrupt mask-register failure. **AMI Color:** Memory Read/Write. **AMI Ez-Flex:** Memory Read/Write tested. **AMI Plus:** Power on message display OK. **AWARD Elite:** Enable slots 2. **AWARD ISA/EISA:** Slot 2 EISA initialized and enabled. **Compaq General:** Initialize 287 coprocessor. **Dell:** Master interrupt-mask register bad. **DTK:** Testing DRAM refresh circuitry. **Eurosoft 4.71:** Master DMA controller 1

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failed. **Faraday:** Test parallel-port loopback. **HP:** Test 8742 keyboard controller. **IBM:** Clear parity error and channel lock. **Landmark:** Memory refresh error. **Mr. Version 3.4x:** Set/reset numlock LED, security functions. **NCR:** Test DMA controller 2. **Olivetti:** Test clock calendar. **Phoenix 4.0:** Test 8742 keyboard controller. **Phoenix 4.0 Release 6.0:** Test 8742 keyboard controller. **Phoenix ISA/EISA/MCA v3.07:** Master interrupt mask register failure. **Phoenix PCI:** Test 8742 keyboard controller; Self test send to keyboard controller and awaiting results; Read the switch inputs from the 8742 keyboard controller and write the keyboard controller command byte. **Quadtel:** 8742 keyboard controller self test. **SuperSoft:** Memory refresh error.

23: ALR: Slave-interrupt mask-register failure. **AMI Color:** BIOS vector table initialization. **AMI Ez-Flex:** Perform setup's prior to initialization of the vector table. **AMI Win:** Set BIOS stack, setup before int. vector init. **AWARD Elite:** Enable slots 3. **AWARD ISA/EISA:** Slot 3 EISA initialized and enabled. **AWARD Version 6.0:** Check validity of RTC value; Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead; Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information; Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots; Early PCI initialization - Enumerate PCI bus number, assign memory & I/O resource, search for a valid VGA device & VGA BIOS, and put it into C000: 0. **Compaq General:** Test the keyboard and 8042. **Dell:** Slave interrupt-mask register bad. **Eurosoft 4.71:** Slave DMA controller 2 failed. **Faraday:** Test serial-port loopback. **IBM:** Initialize interrupt 0. **Landmark:** CPU protected mode error. **Mr. Version 3.4x:** Final onboard serial and parallel ports check. **NCR:** Test timer 1 counter 0 840nS clock timer. **Olivetti:** Dummy checkpoint. **Phoenix ISA/EISA/MCA v3.07:** Slave interrupt mask register failure. **SuperSoft:** CPU protected mode error.

24: Acer: 8042 keyboard controller tested. **AMI Color:** BIOS vector table initialization. **AMI Ez-Flex:** Initialize BIOS vector table in lower 1KB of system RAM. **AMI Win:** Interrupt vector initialization. **AWARD Elite:** Enable slots 4. **AWARD ISA/EISA:** Slot 4 EISA initialized and enabled. **Compaq General:** Reset A20, set default CPU speed. **Eurosoft 4.71:** Protected mode entered successfully. **Faraday:** Test CMOS real time clock. **HP:** Set ES segment register to 4GB. **IBM:** Check CMOS RAM validity. **Landmark:** 8259 interrupt controller 1 error. **Mr. Version 3.4x:** Set keyboard typematic rate. **NCR:** Initialize both interrupt controllers. **Olivetti:** Test watchdog timer. **Phoenix 4.0:** Set ES segment register to 4GB. **Phoenix 4.0 Release 6.0:** Set ES segment register to 4GB. **Phoenix PCI:** Set ES segment register to 4GB. **Quadtel:** MC 146818 CMOS test. **SuperSoft:** 8259 programmable interrupt controller 1 error.

25: ALR: Interrupt vector loading in progress. **AMI Color:** Turbo check of 8042 keyboard controller. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Win:** Read input port of 9042 chip, clear password. **AWARD Elite:** Enable slots 5. **AWARD ISA/EISA:** Slot 5 EISA initialized and enabled. **Compaq General:** Test diskette subsystem. **Dell:** Loading interrupt vectors. **DTK:** Base 64KB memory test. **Eurosoft 4.71:** RAM test completed. **Faraday:** Test the CMOS shutdown. **IBM:** Write keyboard-controller command byte. **Landmark:** 8259 interrupt controller 2 error. **Mr. Version 3.4x:** Initialize floppy controller. **NCR:** Check for unexpected interrupts. **Olivetti:** Test 64KB to 640KB RAM. **Phillips:** System options error. **Phoenix ISA/EISA/MCA v3.07:** Interrupt vector loading in progress. **SuperSoft:** 8259 programmable interrupt controller 2 error.

26: AMI Color: Global data table for keyboard controller; turbo. **AMI Ez-Flex:** Global for keyboard controller tested. **AMI Win:** Initialize global data for turbo switch. **AWARD Elite:** Enable slots 6. **AWARD ISA/EISA:** Slot 6 EISA initialized and enabled. **Compaq General:** Test fixed disk subsystem. **Eurosoft 4.71:** BIOS RAM checksum tested. **Faraday:** Test memory above 1MB. **HP:** Enable A-20 line. **Landmark:** Unexpected interrupt detect. **Mr. Version 3.4x:** Initialize ATA discs. **NCR:** Wait for interrupt. **Olivetti:** Configure lower 640KB RAM. **Phoenix 4.0 Release 6.0:** Enable gate A20 line. **Phoenix PCI:** Enable address line A20. **Quadtel:** Start first protected mode test. **SuperSoft:** Unexpected interrupt detected.

27: ALR: Keyboard-controller test failure. **AMI Color:** Video mode tested. **AMI Ez-Flex:** Perform setups for vector table initialization. **AMI Win:** Initialize before setting video mode. **AWARD Elite:** Enable slots 7. **AWARD ISA/EISA:** Slot 7 EISA initialized and enabled. **AWARD Version 6.0:** Initialize INT 09 buffer. **Compaq General:** Initialize parallel printer. **Dell:** Keyboard-controller test failed. **Eurosoft 4.71:** BIOS RAM checksum test failed. **Landmark:** Interrupt 0, system timer, error. **Mr. Version 3.4x:** Set video mode for primary adapter. **NCR:** Test timer 2 counter 0 for NMI. **Olivetti:** Test extended memory. **Phoenix ISA/EISA/MCA v3.07:** Keyboard controller test failure. **SuperSoft:** Interrupt 0 (timer) error.

28: Acer: CPU descriptor instruction tested. **ALR:** RTC power failure and checksum calculation in progress. **AMI Color:** Monochrome tested. **AMI Ez-Flex:** Monochrome video mode tested. **AMI Win:** Set video mode. **AWARD Elite:** Enable slots 8. **AWARD ISA/EISA:** Slot 8 EISA initialized and enabled. **Compaq General:** Perform search for optional ROM's. **Dell:** CMOS RAM battery bad. **Eurosoft 4.71:** Protected mode exit successful. **HP:** Autosize DRAM. **Landmark:** CMOS RTC error. **Mr. Version 3.4x:** Cyrix WB-CPU support, purge 8259 slave. **NCR:** Test timer 2 counter. **Olivetti:** Initialize extended BIOS data segment and log POST error. **Phoenix 4.0:** Autosize DRAM. **Phoenix 4.0 Release 6.0:** Autosize DRAM. **Phoenix ISA/EISA/MCA v3.07:** CMOS power failure; checksum calculation in progress. **Phoenix PCI:**

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Autosize DRAM. **Quadtel:** Memory sizing test. **SuperSoft:** CMOS real time clock error.

29: ALR: Real-time clock configuration validation in progress. **AMI Color:** Color (CGA) tested. **AMI Ez-Flex:** Video (CGA) color mode tested. **AWARD Elite:** Enable slots 9. **AWARD ISA/EISA:** Slot 9 EISA initialized and enabled. **AWARD Version 6.0:** Program CPU internal MTRR (P6 & PII) for 0-640K memory address; Initialize the APIC for Pentium class CPU; Program early chipset according to CMOS setup; Measure CPU speed; Invoke video BIOS. **Compaq General:** Test valid system configuration. **Dell:** CMOS configuration validation in progress. **Eurosoft 4.71:** Keyboard power-up reply received. **HP:** Initialize POST memory manager. **Landmark:** NMI error. **Mr. Version 3.4x:** Reset A20 to OFF, Install adapter ROM's. **Olivetti:** Configure memory above 1MB. **Phoenix 4.0 Release 6.0:** Initialize POST memory manager. **Phoenix ISA/EISA/MCA v3.07:** CMOS RAM configuration validation in progress. **SuperSoft:** Nonmaskable interrupt error.

2A: AMI Color: Parity-enable tested. **AMI Ez-Flex:** Parity enable tested. **AMI Win:** Initialize BUS. **AWARD Elite:** Enable slots 10. **AWARD ISA/EISA:** Slot 10 EISA initialized and enabled. **Compaq General:** Clear screen. **Eurosoft 4.71:** Keyboard power-up reply missing. **HP:** Clear 512K base RAM. **Landmark:** Locate and test math coprocessor. **Mr. Version 3.4x:** Clear primary screen, convert RTC to system ticks, set final DOS timer variable. **Olivetti:** Dummy checkpoint. **Phoenix 4.0:** Clear 512K base RAM. **Phoenix 4.0 Release 6.0:** Clear 512KB base RAM. **Phoenix PCI:** Clear first 64K of RAM. **Quadtel:** Autosize memory chips. **SuperSoft:** 8087 math coprocessor error.

2B: ALR: Screen-memory test failure. **AMI Color:** Optional system ROM's check start. **AMI Ez-Flex:** Check for optional ROM's. **AMI Win:** Setup before operational video check. **AWARD Elite:** Enable slots 11. **AWARD ISA/EISA:** Slot 11 EISA initialized and enabled. **Compaq General:** Check for invalid time and date. **Dell:** Video-memory test failed. **Eurosoft 4.71:** Keyboard disable command tested. **Mr. Version 3.4x:** Enable NMI and latch. **Olivetti:** Test RAM parity. **Phillips:** Video sync error. **Phoenix ISA/EISA/MCA v3.07:** Screen memory test failure.

2C: Acer: 8259 PIT tested. **ALR:** Screen-initialization failure. **AMI Color:** Video ROM check. **AMI Ez-Flex:** Check for video ROM. **AMI Win:** Control to optional video ROM. **AWARD Elite:** Enable slots 12. **AWARD ISA/EISA:** Slot 12 EISA initialized and enabled. **Compaq General:** Optional ROM search. **Dell:** Video initialization failure. **Eurosoft 4.71:** Keyboard disable command failed. **HP:** RAM address line failure. **Olivetti:** Test DMA page registers. **Phillips:** Video BIOS ROM error. **Phoenix 4.0:** Test 512K base address lines. **Phoenix 4.0 Release 6.0:** RAM failure on address line *xxxx* **Phoenix ISA/EISA/MCA v3.07:** Screen initialization failure. **Phoenix PCI:** Test RAM address lines. **Quadtel:** Chip interleave enable test.

2D: ALR: Screen-retrace test failure. **AMI Color:** Reinitialize main chipset. **AMI Ez-Flex:** Determine if EGA/VGA is installed. **AMI Win:** Proc. after optional video ROM routine. **AWARD Elite:** Enable slots 13. **AWARD ISA/EISA:** Slot 13 EISA initialized and enabled. **AWARD Version 6.0:** Initialize multi-language; Put information on screen display, including Award title, CPU type, CPU speed, etc... **Compaq General:** Test timer 2. **Dell:** Video-retrace failure. **Eurosoft 4.71:** Checking for video system. **Olivetti:** Test DMA controller registers. **Phillips:** Monochrome/color configuration error. **Phoenix ISA/EISA/MCA v3.07:** Screen retrace test failure.

2E: ALR: Search believed operational on screen believed running with video ROM. **AMI Color:** Video memory tested. **AMI Ez-Flex:** Video memory is tested if non EGA/VGA. **AMI Win:** Display memory Read/Write test if no EGA/VGA. **AWARD Elite:** Enable slots 14. **AWARD ISA/EISA:** Slot 14 EISA initialized and enabled. **Dell:** Searching for a video ROM. **Eurosoft 4.71:** Searching for a video ROM. **HP:** RAM data failure, low byte. **Mr. Version 3.4x:** Fast A20, fix A20. **Olivetti:** Test DMA transfer-count register. **Phillips:** No video memory detected. **Phoenix 4.0:** Test 512K base memory. **Phoenix 4.0 Release 6.0:** RAM failure on data bits *xxxx* of low byte of memory bus. **Phoenix ISA/EISA/MCA v3.07:** Search for video ROM in progress. **Phoenix PCI:** Test first 64K bank of memory by checking chip address line test and RAM test. **Quadtel:** First protected mode test exit.

2F: AMI Color: Video memory tested. **AMI Ez-Flex:** Video memory tested. **AMI Win:** Display memory Read/Write test. **AWARD Elite:** Enable slots 15. **AWARD ISA/EISA:** Slot 15 EISA initialized and enabled. **Compaq General:** Write to diagnostic byte. **Eurosoft 4.71:** About to halt. **HP:** Enable cache before BIOS shadow. **Mr. Version 3.4x:** Purge 8259 slave, control to interrupt 19 boot. **Olivetti:** Initialize DMA controller. **Phoenix 4.0 Release 6.0:** Enable cache before system BIOS shadow.

30: Acer: Temporary Interrupts located and initialized. **ALR:** Monochrome display believed operable. **AMI Color:** Video adapter tested. **AMI Ez-Flex:** Video adapter tested. **AMI Plus:** Readying virtual mode memory test. **AMI Win:** Retrace check. **AST:** Test programmable interrupt controller #1 mask register. **AT&T:** Size base and extended memory. **AWARD Elite:** Size base and extended memory; Size the base memory from 256K to 640K and the extended memory above 1MB. **AWARD ISA/EISA:** Memory size below 256K. **AWARD PnP:** Get size of base and extended memory. **Compaq General:** Clear first 128K bytes of RAM. **Compaq Video:** Error...no horizontal sync present. **Dell:** Switching to video ROM. **DTK:** Set up system stack. **Eurosoft 4.71:** Protected mode entered safely. **HP:** RAM data failure, high byte. **NCR:** Check base 640KB memory. **Olivetti:** Test PIO 61. **Phoenix 4.0 Release 6.0:** RAM failure on data bits

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xxxx of high byte of memory bus. **Phoenix ISA/EISA/MCA v3.07:** Screen believed running with video ROM. **Phoenix PCI:** Find true CPU speed (MHz). **Quadtel:** Unexpected shutdown.

31: AMI Color: Alternate video adapter tested. **AMI Ez-Flex:** Alternate video memory tested. **AMI Plus:** Virtual mode memory test started. **AMI Win:** Display alternate memory Read/Write check. **AST:** Test programmable interrupt controller #2 mask register. **AT&T:** Test base memory from 256K to 640K; Test extended memory from 1MB to the top of memory. **AWARD Elite:** Test base and extended memory; Test the base memory from 256K to 640K and the extended memory above 1MB using various bit patterns. **AWARD ISA/EISA:** Memory test over 256K. **AWARD PnP:** Test base and extended memory, Test base memory from 256K to 640K , test extended memory above 1MB. **Compaq General:** Load interrupt vectors 70-77. **Dell:** Monochrome operation OK. **Eurosoft 4.71:** RAM test complete. **Landmark:** Keyboard controller error. **NCR:** Check extended memory size. **Olivetti:** Test the keyboard. **Phoenix ISA/EISA/MCA v3.07:** Mono monitor believed operational. **SuperSoft:** Keyboard controller error.

32: ALR: Color display (40 column) believed operable. **AMI Color:** Alternate video adapter tested. **AMI Ez-Flex:** Alternate video adapter tested. **AMI Plus:** Processor in virtual mode. **AMI Win:** Alternate display retrace check. **AST:** Test programmable interrupt controller's for stuck interrupts. **AT&T:** Display Award Plug & Play BIOS Extension message; Program super I/O chipset. **AWARD Elite:** Test EISA extended memory. **AWARD ISA/EISA:** EISA memory tested found during slot initialization. **AWARD PnP:** Test all on-board super I/O ports. **Compaq General:** Load interrupt vectors 00-1F. **Dell:** Color (CGA) operation OK. **Eurosoft 4.71:** Master interrupt controller (PIC 1) tested. **HP:** Test CPU BUS clock frequency. **Landmark:** Stuck key detected or CMOS RAM error. **Mr. Version 3.4x:** Test CPU burst. **NCR:** Test higher 8 address lines. **Olivetti:** Initialize keyboard typematic rate and delay. **Phoenix 4.0:** Test CPU bus-clock frequency. **Phoenix 4.0 Release 6.0:** Test CPU bus clock frequency. **Phoenix ISA/EISA/MCA v3.07:** Color monitor (40 columns) believed operational. **Phoenix PCI:** Find true CPU speed (MHz). **Quadtel:** System board memory size. **SuperSoft:** Stuck key or CMOS RAM error. **Zenith:** Point interrupt vectors.

33: ALR: Color display (80 column) believed operable. **AMI Color:** Video mode tested. **AMI Ez-Flex:** Video mode tested. **AMI Plus:** Memory address line test. **AST:** Test for stuck NMI (P386 25.33, P486, CLAM and EISA). **AWARD Version 6.0:** Reset keyboard except Winbond 977 series Super I/O chips. **Compaq General:** Initialize MEMSIZE and RESETWD. **Dell:** Color operation OK. **DTK:** Read-system configuration through 8042 keyboard controller. **Eurosoft 4.71:** Master interrupt controller (PIC 1) failed. **Mylex BIOS. HP:** Initialize POST dispatch manager. **Landmark:** Floppy controller error. **NCR:** Test base memory. **Olivetti:** Test auxiliary device. **Phoenix 4.0 Release 6.0:** Initialize Phoenix Dispatch Manager. **Phoenix ISA/EISA/MCA v3.07:** Color monitor (80 columns) believed operational. **SuperSoft:** Floppy controller error. **Zenith:** turn on parity generation.

34: Acer: BIOS Interrupt vectors and routines configured. **AMI Color:** Video mode tested. **AMI Ez-Flex:** Video mode tested. **AMI Plus:** Memory address line test. **AMI Win:** Set display mode. **AST:** Test for stuck DDNIL status (CLEM only). **Compaq General:** Verify CMOS checksum. **Dell:** Timer-tick interrupt in progress (or bad). **Eurosoft 4.71:** Slave interrupt controller (PIC 2) tested. **HP:** Test CMOS RAM. **Landmark:** Floppy disk read error. **Mr. Version 3.4x:** Determine 8042, set warm boot flag STS 2. **NCR:** Test extended memory up to 256MB. **Olivetti:** Test advanced protected mode. **Phoenix ISA/EISA/MCA v3.07:** No time tick. **Phoenix PCI:** Clear CMOS diagnostic byte (register E); Check real time clock and verify battery; Checksum the CMOS and verify for corruption. **Quadtel:** Relocate shadow RAM if configured. **SuperSoft:** Floppy disk read error. **Zenith:** Initialize system variables.

35: AMI Color: Initialize BIOS ROM data area. **AMI Ez-Flex:** BIOS ROM data area initialized. **AMI Plus:** Memory below 1MB calculated. **Compaq General:** CMOS checksum is not valid. **Dell:** CMOS shutdown test in progress (or bad). **Eurosoft 4.71:** Slave interrupt controller (PIC 2) failed. **HP:** Initialize alternate chipset registers. **Landmark:** MDA video memory error. **Mr. Version 3.4x:** Test high memory area wrap, verify A20 via F000: 10 high memory area. **NCR:** Test RAM in segment E000h. **Olivetti:** Configure parallel ports. **Phillips:** Interrupt controller error. **Phoenix ISA/EISA/MCA v3.07:** Shutdown test in progress or failure. **SuperSoft:** MDA video memory error. **Zenith:** Initialize interrupt controllers.

36: AMI Color: Power-on message display. **AMI Ez-Flex:** Power on display cursor set. **AMI Plus:** Memory size computation OK. **Compaq General:** Check battery power. **Dell:** Gate A20 bad. **Eurosoft 4.71:** Chipset initialization. **HP:** Warm start shut-down. **Landmark:** Color video memory error. **Olivetti:** Configure 8250 serial ports. **Phillips:** Byte swapper error. **Phoenix 4.0 Release 6.0:** Warm start shut down. **Phoenix ISA/EISA/MCA v3.07:** Gate A20 failure. **Phoenix PCI:** External cache is autosized and its configuration for enabling later in POST. **Quadtel:** Configure EMS system. **SuperSoft:** CGA, EGA/VGA RAM error. **Zenith:** Check error that occurred.

37: AMI Color: Power-on message display. **AMI Ez-Flex:** Power on message displayed. **AMI Plus:** Memory test in progress. **AMI Win:** Display power-on message. **Compaq General:** Check for game adapters. **Dell:** Unexpected interrupt in protected mode. **DTK:** Test keyboard clock and data line. **Eurosoft 4.71:** Chipset initialization failed. **HP:** Reinitialize chipset (MB only). **Landmark:** EGA/VGA RAM error. **Mr. Version 3.4x:** CPU step NZ, CPUID, disable CPU features. **Olivetti:** Test and configure math co-processor.

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Phillips: NMI error. **Phoenix 4.0:** Reinitialize the chipset. **Phoenix ISA/EISA/MCA v3.07:** Unexpected interrupt in protected mode. **SuperSoft:** CGA, EGA/VGA RAM error. **Zenith:** Reinitialize SCP warm boot.

38: Acer: CMOS RAM tested. **AMI Color:** Read cursor position. **AMI Ez-Flex:** Cursor position read. **AMI Plus:** Memory initialization below 1MB. **AMI Win:** Initialize BUS types. **Compaq General:** Check for Serial ports. **Dell:** RAM test in progress or high address line is bad. **Eurosoft 4.71:** BIOS shadowing tested. **HP:** Shadow system BIOS ROM. **Landmark:** BIOS ROM checksum error. **Mr. Version 3.4x:** Set 8042 pins. **Olivetti:** Test and configure game-port adapter. **Phillips:** Timer interrupt fault. **Phoenix 4.0:** Shadow system BIOS ROM. **Phoenix 4.0 Release 6.0:** Shadow system BIOS ROM. **Phoenix ISA/EISA/MCA v3.07:** Memory high address line failure at 01000-0A000; RAM test in progress or address failure >FFFh. **Phoenix PCI:** External cache is autosized and its configuration for enabling later in POST. **Quadtel:** Configure wait states. **SuperSoft:** BIOS ROM checksum error. **Zenith:** Test CMOS diagnostics, power and reset.

39: AMI Color: Display cursor reference. **AMI Ez-Flex:** Display cursor reference. **AMI Plus:** Memory initialization above 1MB. **AMI Win:** Display BUS initialization error messages. **Compaq General:** Check for parallel printer ports. **Eurosoft 4.71:** BIOS shadowing failed. **HP:** Reinitialize cache (MB only). **Mr. Version 3.4x:** PCI bus. **Olivetti:** Configure and initialize hard disk. **Phillips:** LSI timer halted. **Phoenix 4.0:** Reinitialize the cache. **Phoenix ISA/EISA/MCA v3.07:** Memory high address line failure at 100000-FFFFFF. **Zenith:** Reserved or DDNIL status flag check.

3A: AMI Color: Display BIOS setup message. **AMI Ez-Flex:** Display Setup message. **AMI Plus:** Display memory size. **AMI Win:** Display the hit <DEL> message. **Compaq General:** Initialize port and comm time-outs. **Dell:** Interval timer channel 2 bad. **Eurosoft 4.71:** Video BIOS shadowing tested. **HP:** Autosize cache. **Mr. Version 3.4x:** Scan PCI bus. **Olivetti:** Floppy disk configuration. **Phillips:** Main memory test error. **Phoenix 4.0:** Autosize cache. **Phoenix 4.0 Release 6.0:** Autosize cache. **Phoenix ISA/EISA/MCA v3.07:** Interval timer channel 2 test or failure. **Phoenix PCI:** External cache is autosized and its configuration for enabling later in POST. **Quadtel:** Retest 64K RAM base memory. **Zenith:** Test CPU reset if 80386.

3B: AMI Plus: Ready to start memory below 1MB. **AMI Win:** Virtual modem memory test. **Compaq General:** Flush keyboard buffer. **Dell:** Time-of-day test bad. **Eurosoft 4.71:** Video BIOS shadowing failed. **Mr. Version 3.4x:** Initialize PCI bus with intermediate defaults. **Olivetti:** Initialize ROM drivers. **Phillips:** Keyboard error. **Phoenix ISA/EISA/MCA v3.07:** Time of day clock test in progress or failure. **Zenith:** Save the CPUID in GS.

3C: Acer: Memory size determined. **AMI Plus:** Memory test below 1MB OK. **AT&T:** Set flag to allow access to CMOS setup. **AWARD Elite:** Setup enabled. **AWARD ISA/EISA:** CMOS setup; Enter protected mode. **AWARD PnP:** Set flag to allow CMOS setup utility. **AWARD Version 6.0:** Test 8254. **Dell:** Serial-port test bad. **HP:** Configure advanced chipset registers. **Mr. Version 3.4x:** Initialize PCI OEM: OEM bridge. **Olivetti:** Display total memory and hard drives. **Phillips:** Keyboard interrupt error. **Phoenix 4.0:** Configure advanced chipset registers. **Phoenix 4.0 Release 6.0:** Advanced configuration of chipset registers. **Phoenix ISA/EISA/MCA v3.07:** Serial port test or failure. **Phoenix PCI:** Configure advanced cache features; Configure external cache's configurable parameters. **Quadtel:** CPU speed calculation. **Zenith:** Slush video ROM at C0000.

3D: AMI Plus: Memory test above 1MB OK. **AT&T:** Initialize keyboard; Initialize PS/2 mouse. **AWARD Elite:** Initialize and install mouse if present. **AWARD ISA/EISA:** Mouse/adapter, CMOS. **AWARD PnP:** Install PS/2 mouse. **Dell:** Parallel -port test bad. **HP:** Load alternate registers new CMOS values. **Mr. Version 3.4x:** PCI bus and Plug & Play: initialize AT slot name from AT bus CDE usage. **Olivetti:** Final initialization. **Phillips:** DDNIL scan halted and cache disabled. **Phoenix 4.0:** Load alternate registers with CMOS values. **Phoenix 4.0 Release 6.0:** Load alternate registers with CMOS values. **Phoenix ISA/EISA/MCA v3.07:** Parallel port test or failure. **Zenith:** Initialize the video and timers.

3E: AMI Plus: Ready to switch to real mode. **AT&T:** Initialize L2 cache. **AWARD Elite:** Setup cache controller. **AWARD ISA/EISA:** Cache RAM. **AWARD PnP:** Try to turn on level 2. **AWARD Version 6.0:** Test 8259 interrupt mask bits for channel 1. **Dell:** Math co-processor test bad. **Mr. Version 3.4x:** Find phantom CDE ROM PCI cards. **Olivetti:** Detect and initialize parallel ports. **Phoenix ISA/EISA/MCA v3.07:** Math coprocessor test. **Phoenix PCI:** Read hardware configuration from keyboard controller. **Quadtel:** Get switches from 8042 keyboard controller. **Zenith:** Initialize CMA ports; Clear page.

3F: AMI Plus: Shutdown successful. **AWARD ISA/EISA:** Shadow RAM. **Dell:** Cache-memory test bad. **Mr. Version 3.4x:** PCI bus: final fast back-to-back state. **Olivetti:** Initialize hard drive and controller. **Phoenix ISA/EISA/MCA v3.07:** Cache test (Dell). **Zenith:** Set speed too fast for now.

40: Acer: Shutdown condition 1. **AMI Color:** Start protected mode tested. **AMI Ez-Flex:** Protected mode tested. **AMI Plus:** Ready to disable gate A-20 (8042). **AMI Win:** Prepare descriptor tables. **AST:** Test CMOS RAM backup battery. **AWARD Elite:** Display virus protect disable or enable. **AWARD Version 6.0:** Test 9259 interrupt mask bits for channel 2. **Compaq General:** Save RESET WD value. **Compaq Video:** Error...color register failure. **DTK:** Determine video type. **HP:** Set initial CPU speed. **IBM:** Check valid CMOS RAM and video system. **Mr. Version 3.4x:** OEM post initialization, hook audio. **NCR:** Test keyboard

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enable/disable. **Olivetti:** Initialize math co-processor. **Phillips:** Diskette error. **Phoenix 4.0:** Set initial CPU speed. **Phoenix ISA/EISA/MCA v3.07:** System board select bad (Micro Channel only). **Phoenix PCI:** Set system power-on speed to the rate determined by the CMOS; If the CMOS is invalid, use a lower speed. **Quadtel:** Configure CPU speed. **Zenith:** Checksum the nonvolatile RAM.

41: AMI Color: Build mode entry. **AMI Ez-Flex:** Build descriptor tables. **AMI Plus:** Gate A-20 disabled (8042). **AST:** Calculate and verify CMOS checksum. **AT&T:** Initialize floppy controller and floppy drives. **AWARD Elite:** Initialize floppy. **AWARD ISA/EISA:** Initialize floppy drive. **AWARD PnP:** Initialize floppy drive controller. **Compaq General:** Check RAM refresh. **IBM:** Display error code 160. **Landmark:** Memory error. **Mr. Version 3.4x:** Allocate I/O on PCI bus, logs in PCI-IDE. **NCR:** Test keyboard reset command. **Phoenix 4.0 Release 6.0:** Initialize extended memory for RomPilot. **Phoenix ISA/EISA/MCA v3.07:** Extended CMOS RAM bad (Micro Channel only). **SuperSoft:** Memory error at address x. **Zenith:** Initialize configuration.

42: AMI Color: CPU enters protected mode. **AMI Ez-Flex:** CPU enters protected mode. **AMI Plus:** About to test DMA controller (8237). **AMI Win:** Enter virtual mode for memory test. **AST:** Setup CMOS RAM options (except WS386SX16). **AT&T:** Initialize hard drive controller and hard drives. **AWARD Elite:** Initialize hard drive. **AWARD ISA/EISA:** Initialize hard drive. **AWARD PnP:** Initialize hard drive controller. **Compaq General:** Start write of 128K RAM test. **HP:** Initialize interrupts. **IBM:** Test registers in both interrupt controllers. **Landmark:** Refresh fault. **Mr. Version 3.4x:** Hook PCI-ATA chips. **NCR:** Test keyboard. **Olivetti:** Initialize adapter ROM scan. **Phoenix 4.0:** Initialize interrupt vectors. **Phoenix 4.0 Release 6.0:** Initialize interrupt vectors. **Phoenix PCI:** Initialize interrupt vectors 0-77h to the BIOS general interrupt handler. **Quadtel:** Initialize interrupt vectors. **SuperSoft:** Slow refresh, address x. **Zenith:** Initialize expansion boards from VRAM.

43: AMI Color: Protected mode Interrupt enable. **AMI Ez-Flex:** Protected mode interrupt enabled. **AMI Win:** Enable Interrupts for diagnostic mode. **AT&T:** initialize serial and parallel ports in PnP BIOS. **AWARD Elite:** Detect & Init. serial & parallel ports. **AWARD ISA/EISA:** RS232 parallel. **AWARD PnP:** Initialize serial & parallel ports (PnP BIOS only). **AWARD Version 6.0:** Test 8259 functionality. **Compaq General:** Reset parity checks. **IBM:** Test interrupt controller registers. **Landmark:** Display problem. **Mr. Version 3.4x:** Allocate IRQ's to PCI bus, enable ATA IRQ's. **NCR:** Test keyboard. **SuperSoft:** Display pass count. **Zenith:** Turn cache off for memory test.

44: Acer: Video BIOS ROM initialized. **AMI Color:** Check descriptor tables. **AMI Ez-Flex:** Descriptor tables checked. **AMI Win:** Initialize data to check memory wrap at 0: 0. **Compaq General:** Start verify of 128K RAM test. **DTK:** Locate and test, if present, MDA and CGA video. **HP:** Initialize BIOS interrupts. **IBM:** Test interrupt mask registers. **Landmark:** Display problem. **Mr. Version 3.4x:** Allocate and enable PCI memory/ROM space. **NCR:** Test address overrun capability. **Phoenix 4.0:** Initialize BIOS interrupts. **Phoenix PCI:** Initialize interrupt vectors 0-20h to proper values from the BIOS interrupt tables. **Quadtel:** Verify video configuration. **SuperSoft:** Display pass count. **Zenith:** Initialize memory counter; Test extended memory.

45: Acer: RAM initialized and tested. **AMI Color:** Check memory size. **AMI Ez-Flex:** Memory size checked. **AMI Win:** Check memory wrap, find total memory amount. **AT&T:** Initialize coprocessor. **AWARD Elite:** Detect and Init. math coprocessor. **AWARD ISA/EISA:** NPU. **AWARD PnP:** Initialize math coprocessor. **Compaq General:** Check for parity errors. **HP:** POST device initialization. **IBM:** Test NMI. **Landmark:** Display problem. **Mr. Version 3.4x:** Determine PS/2 mouse. **NCR:** Initialize the mouse and enable IRQ 1. **Phoenix 4.0 Release 6.0:** POST device initialization. **SuperSoft:** Display pass count. **Zenith:** Test base RAM.

46: Acer: Cache memory and controller initialized and tested. **AMI Color:** Memory Read/Write tested. **AMI Ez-Flex:** Memory read/Write tested. **AMI Win:** Memory write test. **Compaq General:** NO RAM errors. **HP:** Check ROM copyright notice. **IBM:** NMI error has been detected. **Mr. Version 3.4x:** Map IRQ's to PCI bus, enable ATA IRQ's. **Phoenix 4.0:** Check ROM copyright notice. **Phoenix 4.0 Release 6.0:** Check ROM copyright notice. **Phoenix PCI:** Check copyright message checksum. **Quadtel:** Initialize video system. **Zenith:** Determine amount of system RAM.

47: AMI Color: Base 640K memory tested. **AMI Ez-Flex:** Base 640K memory tested. **AMI Win:** 640K base memory write test. **AWARD ISA/EISA:** Speed for boot set. **AWARD Version 6.0:** Initialize EISA slot. **Compaq General:** RAM error detected. **HP:** Initialize manager for PCI option ROM's. **IBM:** Test system timer 0. **Mr. Version 3.4x:** PCI-ROM install, note user CMOS. **Phoenix 4.0 Release 6.0:** Initialize I20 support. **Zenith:** Test and initialize cache if installed.

48: Acer: Memory tested. **AMI Color:** Check 640K memory size. **AMI Ez-Flex:** Memory below 1MB checked for. **AMI Win:** Determine memory below 1MB. **DTK:** Initialize video 80 x 25 mode. **HP:** Check video configure against CMOS. **IBM:** Check system speaker clock. **Mr. Version 3.4x:** If setup conditions: execute setup utility. **Phillips:** Adapter card error. **Phoenix 4.0:** Check video configuration against CMOS. **Phoenix 4.0 Release 6.0:** Check video configuration against CMOS. **Phoenix PCI:** Check video configuration. **Quadtel:** Test unexpected interrupts. **Zenith:** Test system timer tick.

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49: AMI Color: Check extended memory size. **AMI Ez-Flex:** Memory above 1MB checked for. **AMI Win:** Determine memory above 1MB. **AWARD Version 6.0:** Calculate total memory by testing the last double last word of each 64K page; Program writes allocation for AMD K5 CPU. **HP:** Initialize manager for PCI option ROM's. **IBM:** Test system timer 0 count. **Mr. Version 3.4x:** Test F000, transfer EPROM to shadow RAM. **Phoenix 4.0:** Initialize PCI bus and devices. **Phoenix 4.0 Release 6.0:** Initialize PCI bus and devices. **Zenith:** Initialize the write queues.

4A: AMI Color: Verify CMOS extended memory. **AMI Ez-Flex:** ROM BIOS data area checked. **HP:** Initialize all video adapters. **IBM:** Test system timer 1 count. **Mr. Version 3.4x:** Hook VLATA chip. **Phoenix 4.0:** Initialize all video adapters in system. **Phoenix 4.0 Release 6.0:** Initialize all video adapters in system. **Phoenix PCI:** Initialize both monochrome and color graphics video adapters. **Quadtel:** Start second protected mode test. **Zenith:** Initialize monitor RAM.

4B: AMI Color: Check for soft/hard reset. **AMI Ez-Flex:** Memory below 1MB cleared for soft reset. **AMI Win:** Check for soft reset, clear memory below 1MB. **HP:** Display quiet boot screen. **IBM:** Check if timer interrupt occurred. **Mr. Version 3.4x:** Identify and spin up all drives. **Phoenix 4.0 Release 6.0:** QuietBoot start (optional). **Zenith:** Clear 16K of base RAM.

4C: Acer: Shutdown condition 3. **AMI Color:** Clear extended memory locations. **AMI Ez-Flex:** Memory above 1MB cleared for soft reset. **AMI Win:** Clear memory above 1MB. **HP:** Shadow video BIOS. **IBM:** Test timer 0 for improper operation (too fast or too slow). **Mr. Version 3.4x:** Detect secondary IRQ, if VL/AT bus IDE exists but it's IRQ not known yet. **Phillips:** CMOS battery/checksum error. **Phoenix 4.0:** Shadow video BIOS ROM. **Phoenix 4.0 Release 6.0:** Shadow video BIOS ROM. **Phoenix PCI:** Display copyright message. **Quadtel:** Verify LDT protected mode instruction. **Zenith:** Install BIOS interrupt vectors.

4D: AMI Color: Update CMOS memory size. **AMI Ez-Flex:** Update CMOS memory size. **AMI Win:** Save memory size. **DTK:** Display DTK BIOS copyright message. **IBM:** Verify timer interrupt 0. **Mr. Version 3.4x:** Detect /log 32-bit I/O ATA devices. **Phillips:** System options error. **Zenith:** Enable default hardware initialization.

4E: AMI Color: Base RAM size displayed. **AMI Ez-Flex:** Display base 64K memory test. **AMI Plus:** Address line test OK. **AMI Win:** Display first 64K memory size. **AT&T:** Error messages displayed if detected (F1 displayed to continue). **AWARD Elite:** Mfg. POST loop, or display messages. **AWARD ISA/EISA:** Manufacturing loop; display any soft errors. **AWARD PnP:** Show all error messages on screen. **AWARD Version 6.0:** Program MTRR of M1 CPU; initialize L2 cache for P6 class CPU & program cacheable range; Initialize the APIC for P6 class CPU; On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical. **HP:** Display BIOS copyright notice. **IBM:** Check 8042 keyboard controller. **Mr. Version 3.4x:** Atapi drive M/S bitmap to shadow RAM, set interrupt 13 vector. **Phoenix 4.0:** Display copyright notice. **Phoenix 4.0 Release 6.0:** Display BIOS copyright notice. **Phoenix PCI:** Display copyright message. **Quadtel:** Verify TR protected mode instruction. **Zenith:** Determine global I/O configuration.

4F: AMI Color: Memory Read/Write test on 640K. **AMI Ez-Flex:** Memory test on base 640K performed. **AMI Plus:** Processor in real mode. **AMI Win:** Sequential and random memory test. **AT&T:** Ask for password if needed; Energy star logo displayed if Green BIOS. **AWARD Elite:** Security password. **AWARD ISA/EISA:** Security; ask for password if security is enabled. **AWARD PnP:** Ask for password, if needed. **DTK:** Check serial and parallel ports. **IBM:** Check for soft reset. **Mr. Version 3.4x:** Finalize shadow RAM. **Phoenix 4.0 Release 6.0:** Initialize MultiBoot.

50: Acer: Shutdown condition 2. **AMI Color:** Update CMOS on RAM size. **AMI Ez-Flex:** RAM size updated for shadow operation. **AMI Plus:** DMA page register test OK. **AMI Win:** Displayed memory size. **AST:** Test the protected mode. **AT&T:** Write all CMOS values currently in the BIOS stack back to the CMOS. **AWARD Elite:** Write CMOS; Write CMOS back to RAM and clear screen. **AWARD ISA/EISA:** CMOS update. **AWARD PnP:** Write all CMOS values located in the BIOS stack back to CMOS. **AWARD Version 6.0:** Initialize USB. **Chips & Tech:** Initialize hardware. **Compaq General:** Check for dual frequency in CMOS. **Compaq Video:** Error...slot type conflict failure. **DTK:** Check floppy disk controller. **HP:** Display CPU type & speed. **IBM:** Prepare for shutdown. **Mr. Version 3.4x:** Chain interrupt 13. **NCR:** Set up hardware interrupt vectors. **Phoenix 4.0:** Display CPU type and speed. **Phoenix 4.0 Release 6.0:** Display CPU type and speed. **Phoenix PCI:** Display CPU type and speed. **Quadtel:** Verify LSL protected mode instruction. **Zenith:** Initialize video.

51: AMI Color: Extended memory tested. **AMI Ez-Flex:** Extended memory test performed. **AMI Plus:** DMA unit-1 base register OK. **AMI Win:** Above 1MB memory test. **AST:** Test protected mode exceptions. **AWARD Elite:** Pre-boot enable; Enable parity checking, enable NMI, enable cache before boot. **AWARD ISA/EISA:** Enable NMI, cache memory. **Chips & Tech:** Initialize timer. **Compaq General:** Check CMOS VDU configuration. **Compaq Video:** Error...video memory conflict error. **HP:** Initialize. **IBM:** Start protected mode test. **Mr. Version 3.4x:** Load Plug & Play, processor vector initialized, BIOS vector initialized, OEM vector initialized. **NCR:** Enable IRQ 0 interval interrupt from timer 0. **Phoenix 4.0 Release 6.0:** Initialize EISA board. **Zenith:** Initialize WD90C30 scratchpad register.

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52: AMI Color: Re-size extended memory. **AMI Ez-Flex:** System is prepared for real mode. **AMI Plus:** DMA unit-1 channel register OK. **AMI Win:** Save memory size information. **AT&T:** Initialize ISA ROM's; Assign IRQ's to any PCI devices, initialize PCI ROM's; PnP initializations; Shadow RAM setup; Parity setup; Power management initialized. **AWARD Elite:** Initialize option ROM's; Initialize any option ROMs present from C800h to EFFFFh. **AWARD ISA/EISA:** Adapter ROM's from C8000h to EFFFFH or F7FFFh initialized. **AWARD PnP:** Initialize all ISA ROM's; PCI initializations (PCI BIOS only), PnP initialization (PnP BIOS Only), setup shadow RAM, initialize power management. **AWARD Version 6.0:** Test all memory (clear all extended memory to 0). **Chips & Tech:** Initialize DMA controller. **Compaq General:** Start VDU ROM search. **Compaq Video:** Error...ROM conflict error. **HP:** Test keyboard. **IBM:** Test memory in 64KB increments. **Mr. Version 3.4x:** Scan for Plug & Play, update Plug & Play device count. **Phillips:** Keyboard controller error. **Phoenix 4.0:** Test keyboard. **Phoenix 4.0 Release 6.0:** Test keyboard. **Phoenix PCI:** Test for the self-test code if a cold start; Keyboard performs a self-test and sends and AA if successful. **Quadtel:** Verify LAR protected mode instruction. **Zenith:** Initialize the keyboard controller.

53: AMI Color: Return CPU to real mode. **AMI Ez-Flex:** CPU is returned to real mode. **AMI Plus:** DMA channel-2 base register test OK. **AMI Win:** Enter real mode. **AT&T:** Serial and parallel ports initialized for non-PnP BIOS. **AWARD Elite:** Initialize time value. **AWARD ISA/EISA:** Set time value for address 40 of BIOS. **AWARD PnP:** If not PnP BIOS, initialize ports; Initialize time in BIOS data area. **Chips & Tech:** Initialize 8259 programmable interrupt controller. **Compaq General:** Vector to VDU option ROM's. **IBM:** Check if memory test done. **Mr. Version 3.4x:** Supplement IRQ usage, AT IRQ's. **Zenith:** Turn off IRQ 12 if mouse is off.

54: Acer: Shutdown condition 7. **AMI Color:** Restore CPU registers. **AMI Ez-Flex:** CPU registers are returned to real mode. **AMI Plus:** About to test both units OK. **AMI Win:** Disable gate A-20 line. **Chips & Tech:** Initialize system chipset. **Compaq General:** Initialize first display adapter. **HP:** Set key click if enabled. **IBM:** Return to real mode. **Mr. Version 3.4x:** Conditionally assign everything Plug & Play wants. **Phoenix 4.0:** Set key click if enabled. **Phoenix 4.0 Release 6.0:** Set key click if enabled. **Phoenix PCI:** Initialize keystroke clicker during POST. **Quadtel:** Verify VERR protected mode instruction. **Zenith:** Wait for user to enter correct password.

55: AMI Color: A-20 gate disabled. **AMI Ez-Flex:** A20 gate disabled. **AMI Plus:** F/F latch tests both units OK. **AWARD Version 6.0:** Display number of processors (multi-processor platform). **Chips & Tech:** Setup EMS configuration. **Compaq General:** Initialize second display adapter. **DTK:** Check shadow RAM. **IBM:** Test for regular or manufacturing mode. **Phoenix 4.0 Release 6.0:** Enable USB devices. **Zenith:** Initialize system clock time of day.

56: AMI Color: BIOS vector recheck. **AMI Ez-Flex:** BIOS data area rechecked. **AMI Plus:** DMA units 1 & 2 programmed OK. **Chips & Tech:** Entering protected mode for first time. **Compaq General:** No display adapters installed. **HP:** Enable keyboard. **IBM:** Disable the keyboard. **Phoenix 4.0:** Enable keyboard. **Phoenix PCI:** Enable keyboard. **Quadtel:** Unexpected exception. **Zenith:** Test and initialize floppy drive controller.

57: AMI Color: BIOS vector check complete. **AMI Ez-Flex:** BIOS data area check complete. **AMI Plus:** 8259 PIC initialization OK. **AMI Win:** Adjust memory size. **AWARD Version 6.0:** Display PnP logo; Early ISA PnP initialization and assign CSN to every ISA PnP device. **Chips & Tech:** Size memory chips. **Compaq General:** Initialize primary VDU mode. **IBM:** Check for keyboard self test. **Zenith:** Initialize Winchester subsystem.

58: Acer: Shutdown condition 6. **AMI Color:** Clear BIOS display setup message. **AMI Ez-Flex:** Setup message displayed. **AMI Plus:** 8259 PIC mask register check OK. **AMI Win:** Clear hit <DEL> message. **Chips & Tech:** Configure memory chip interleave. **Compaq General:** Start of VDU test (each adapter). **DTK:** Start of VDU test (each adapter). **HP:** Test for unexpected interrupts. **IBM:** Keyboard test passed. **Mr. Version 3.4x:** OEM custom boot sequence just prior to interrupt 19 boot. **Phoenix 4.0:** Test for unexpected interrupts. **Phoenix 4.0 Release 6.0:** Test for unexpected interrupts. **Phoenix PCI:** Test for unexpected interrupts; Check STI for hot interrupts; Test NMI for unexpected interrupts; Enable parity checkers and read from memory checking for unexpected interrupt. **Quadtel:** Address line A20 test. **Zenith:** Install ROM's starting at C80000h.

59: AMI Color: DMA, PIT tested. **AMI Ez-Flex:** DMA register page tested. **AMI Plus:** Master 8259 PIC mask register OK. **AMI Win:** DMA/PIC test. **AWARD Version 6.0:** Initialize the combined Trend Anti-Virus code. **Compaq General:** Check existence of adapter. **Chips & Tech:** Exiting protected mode for first time. **HP:** Initialize POST display service. **IBM:** Test the keyboard controller. **Landmark:** No monitor detected. **Mr. Version 3.4x:** Pass control to interrupt 19 boot. **Phoenix 4.0 Release 6.0:** Initialize POST display service. **SuperSoft:** No monitor. **Zenith:** Install ROM's starting at E0000h.

5A: AMI Plus: Check timer and keyboard Interrupt. **Chips & Tech:** Determine system board memory size. **Compaq General:** Check VDU registers. **DTK:** Successful switch back to real mode. **HP:** Display "Press F2 to Enter Setup". **IBM:** Configure the mouse. **Mr. Version 3.4x:** Display MR BIOS logo. **Phoenix 4.0:** Display prompt "Press F2 to Enter Setup". **Phoenix 4.0 Release 6.0:** Display prompt "Press F2 to enter

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SETUP". **Phoenix PCI:** Display prompt "Press F2 to Enter Setup". **Quadtel:** Keyboard ready test. **Zenith:** Initialize SCSI interface.

5B: AMI Plus: PIT timer interrupt OK. **AWARD Version 6.0:** Show message for entering AWDFLASH.EXE from FDD (optional feature). **Chips & Tech:** Relocate shadow RAM. **Compaq General:** Start screen memory test. **HP:** Disable CPU cache. **IBM:** Disable the mouse. **Phoenix 4.0 Release 6.0:** Disable CPU cache. **Zenith:** Initialize SCSI interface.

5C: Acer: Keyboard and auxiliary I/O tested. **AMI Plus:** About to test keyboard Interrupt. **Chips & Tech:** Configure EMS. **Compaq General:** End test of adapter, clear memory. **HP:** Test RAM, 512-640K. **IBM:** Initialize interrupt vectors. **Phoenix 4.0:** Test RAM between 512K and 640K. **Phoenix 4.0 Release 6.0:** Test RAM between 512KB and 640KB. **Phoenix PCI:** Determine and test the amount of memory available; Save total size to BIOS variable called bdaMemorySize. **Quadtel:** Determine AT or XT keyboard. **Zenith:** Initialize cache speed and clock.

5D: AMI Plus: ERROR! Timer/keyboard Interrupt. **AWARD Version 6.0:** Initialize Init_Onboard_Super_IO switch, Initialize Init_Onboard_AUDIO switch. **Chips & Tech:** Set up wait state configuration. **Compaq General:** Error detected on an adapter. **IBM:** Initialize interrupt vectors. **Zenith:** Always tell system ROM cold.

5E: AMI Plus: 8259 PIC Interrupt controller error. **Chips & Tech:** Re-test 64K RAM. **Compaq General:** Test the next adapter. **IBM:** Initialize interrupt vectors. **Phoenix PCI:** Perform address of base memory. **Quadtel:** Start third protected mode test. **Zenith:** Run with gate A20 off in PC mode.

5F: AMI Plus: 8259 PIC Interrupt controller test OK. **Chips & Tech:** Test shadow RAM. **Compaq General:** All adapters successfully tested. **Zenith:** Really turn off the SCP.

60: Acer: BIOS Interrupt routines setup. **AMI Color:** DMA page register tested. **AMI Ez-Flex:** Display memory verified. **AMI Win:** DMA #1 base register test. **AST:** Calculate RAM size. **AT&T:** Virus protection setup for boot sector if enabled. **AWARD Elite:** Setup virus protect. **AWARD ISA/EISA:** Virus protection setup. **AWARD PnP:** Setup virus protection for the boot sector. **AWARD Version 6.0:** Okay to enter Setup utility. **Chips & Tech:** Test CMOS RAM. **Compaq General:** Start of memory tests. **Compaq Video:** Error...red DAC stuck low. **DTK:** Check hard disk drive controller. **HP:** Test extended memory. **IBM:** Save DDNIL status. **NCR:** Test for floppy and hard disk controllers and drives. **Phoenix 4.0:** Test expanded memory. **Phoenix 4.0 Release 6.0:** Test extended memory. **Phoenix PCI:** Determine and test the amount of extended memory available; Save the total size in the CMOS at CMOSExtended. **Quadtel:** Base memory test. **Zenith:** Set machine speed using CFG.

61: AMI Color: DMA #1 tested. **AMI Ez-Flex:** DMA #1 tested. **AST:** Test RAM. **AT&T:** L2 cache enabled; Boot up speed according to setup; Chipset initialization finalized; Power Management finalized; Show system configuration table. **AWARD Elite:** Set boot speed. **AWARD ISA/EISA:** Boot speed. **AWARD PnP:** Try to turn on level 2 cache. **Chips & Tech:** Test video. **Compaq General:** Enter protected mode. **Compaq Video:** Error...green DAC stuck low. **IBM:** Reset floppy drive. **NCR:** Test disk controller. **Zenith:** Turn on cache if machine halt.

62: AMI Color: DMA #2 tested. **AMI Ez-Flex:** DMA #2 tested. **AMI Win:** DMA #2 base register test. **AST:** Test shadow RAM (WS386SX16, P386 25/33, P486, CLEM, EISA); test cache (P386/16). **AT&T:** Setup time/date according to setup values; Program the numlock, typematic rates, and typematic speeds according to setup. **AWARD Elite:** Setup numlock. **AWARD ISA/EISA:** Numlock setup. **AWARD PnP:** program numlock & typematic speed. **Chips & Tech:** Test and initialize DDNIL bits. **Compaq General:** Start memory sizing. **Compaq Video:** Error...blue DAC stuck low. **DTK:** Initialize floppy drive. **HP:** Test extended memory address lines. **IBM:** Test floppy drive. **NCR:** Initialize floppy drives. **Phoenix 4.0:** Test extended memory address lines. **Phoenix 4.0 Release 6.0:** Test extended memory address lines. **Phoenix PCI:** Perform and address line test on A0 to the amount of memory available. **Quadtel:** Base memory address test. **Zenith:** Calibrate 1ms constants.

63: AMI Color: BIOS data area check. **AMI Ez-Flex:** Perform BIOS data area check. **AST:** Test cache memory (P386 25/33, P486, CLEM, EISA); copy video BIOS to shadow RAM (p386C, P386/16, WS386SX16). **AT&T:** ESCD updated if changed to BIOS made; Clear memory that may be used; Boot from interrupt 19. **AWARD Elite:** Boot attempt. **AWARD ISA/EISA:** Boot from Int 19. **AWARD PnP:** Boot system via Int 19h. **Chips & Tech:** Test protected mode interrupt. **Compaq General:** Get CMOS size. **Compaq Video:** Error...DAC stuck high. **IBM:** Turn floppy-drive motor off. **NCR:** Initialize hard drives. **Zenith:** Enable NMI.

64: Acer: RTC tested. **AMI Color:** BIOS data area checked. **AMI Ez-Flex:** BIOS data area checked. **AST:** Copy system BIOS to shadow RAM (P386 25/33, P486, CLEM,EISA); Copy video BIOS to shadow RAM (P386 16, WS386SX16). **Chips & Tech:** Test address line A20. **Compaq General:** Start test of real memory. **Compaq Video:** Error...red DAC fault. **HP:** Jump to user patch 1. **IBM:** Set up serial ports. **Phoenix 4.0:** Jump to User Patch 1. **Phoenix 4.0 Release 6.0:** Jump to User Patch 1. **Quadtel:** Shadow memory test. **Zenith:** Test for errors before boot.

65: AMI Color: Initialize DMA chips. **AMI Ez-Flex:** DMA initialized. **AMI Win:** Program DMA unit 1 and 2. **AST:** Copy video BIOS to shadow RAM (P386 25/33, P486, CLEM,EISA); Test cache (WS386SX16). **AWARD Version 6.0:** Initialize PS/2 mouse. **Chips & Tech:** Test memory address lines. **Compaq General:** Start

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test of extended memory. **Compaq Video:** Error...green DAC fault. **DTK:** Initialize hard drive. **IBM:** Enable real time clock interrupt. **Zenith:** Call interrupt 19 boot loader.

66: AMI Color: 8259 PIC initialization. **AMI Ez-Flex:** 8259 PIC initialized. **AMI Win:** Initialize 8259 Interrupt controller. **AST:** Test 8254 programmable interrupt timer channel 2 (P386 25/33, P486, EISA). **Chips & Tech:** Test memory. **Compaq General:** Save size memory (base, ext). **Compaq Video:** Error...blue DAC fault. **HP:** Configure advanced cache registers. **IBM:** Configure floppy drives. **Phoenix 4.0:** Configure advanced cache registers. **Phoenix 4.0 Release 6.0:** Configure advanced cache registers. **Quadtel:** Extended memory test.

67: AMI Color: Keyboard tested. **AMI Ez-Flex:** Keyboard tested. **AMI Win:** Keyboard test. **AST:** Initialize memory (Eagle only). **AWARD Version 6.0:** Prepare memory size information for function call: INT 15h ax=E820h. **Chips & Tech:** Test extended memory. **Compaq General:** 128K-option installed CMOS bit. **DTK:** Initialize the floppy disk drive and the hard disk drive. **HP:** Initialize multi-processor APIC. **IBM:** Configure hard drives. **Phoenix 4.0 Release 6.0:** Initialize Multi Processor APIC.

68: Acer: Floppy drive and controller tested. **Chips & Tech:** Test timer interrupt. **Compaq General:** Prepare to return to real mode. **HP:** Enable external & processor caches. **IBM:** Enable system CPU arbitration. **Phoenix 4.0:** Enable external and CPU caches.. **Phoenix 4.0 Release 6.0:** Enable external and CPU caches. **Phoenix PCI:** External and CPU caches, if present, are enabled. **Quadtel:** Extended address test.

69: AWARD Version 6.0: Turn on L2 cache. **Chips & Tech:** Test real time clock (RTC). **Compaq General:** Back in real mode-successful. **HP:** Set up SMM area. **IBM:** Scan for adapter ROM's. **Phoenix 4.0 Release 6.0:** Setup system management mode (SMM) area.

6A: Chips & Tech: Test keyboard. **Compaq General:** Protected mode error during test. **DTK:** Disable gate A20 and test math coprocessor. **HP:** Display external L2 cache size. **IBM:** Verify serial and parallel ports. **Phillips:** Failure shadowing BIOS ROM. **Phoenix 4.0:** Display external cache size. **Phoenix 4.0 Release 6.0:** Display external L2 cache size. **Phoenix PCI:** Display cache size on screen if non-zero. **Quadtel:** Determine memory size.

6B: AWARD Version 6.0: Program chipset registers according to items described in Setup & Auto-Configuration table. **Chips & Tech:** Test 80x87 math chip. **Compaq General:** Display error message. . **IBM:** Set up equipment byte. **Phoenix 4.0 Release 6.0:** Load custom defaults (optional).

6C: Acer: Hard drive and controller tested. **Chips & Tech:** Test RS232 serial ports. **Compaq General:** End of memory test. **HP:** Display shadow area message. **IBM:** Set up configuration. **Phoenix 4.0:** Display shadow message. **Phoenix 4.0 Release 6.0:** Display shadow area message. **Phoenix PCI:** Display BIOS shadow status. **Quadtel:** Display error messages.

6D: AWARD Version 6.0: Assign resources to all ISA PnP devices; Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO". **Chips & Tech:** Test parallel ports. **Compaq General:** Initialize KB OK display string. **IBM:** Set keyboard-typematic rate.

6E: Chips & Tech: Test dual card. **Compaq General:** Determine size to test. **HP:** Display high address for UMB recovery. **IBM:** Call Int. 19 boot loader. **Phoenix 4.0:** Display non-disposable segments. **Phoenix 4.0 Release 6.0:** Display possible high address for UMB recovery. **Phoenix PCI:** Display the starting offset of the non-disposable section of the BIOS. **Quadtel:** Copy BIOS to shadow memory.

6F: AWARD Version 6.0: Initialize floppy controller; Setup floppy related fields in 40: hardware. **Chips & Tech:** Test floppy drive controller. **Compaq General:** Start MEMORY TEST.

70: Acer: Parallel port tested. **AMI Plus:** Start of keyboard test. **Chips & Tech:** Test hard drive controller. **Compaq Video:** Error...bad alternate ROM version. **Compaq General:** Display XXXXX KB OK. **DTK:** Set system date and time RTC-146918. **HP:** Display error message. **NCR:** Test RTC. **Phillips:** Memory size configuration error. **Phoenix 4.0:** Display error messages. **Phoenix 4.0 Release 6.0:** Display error messages. **Phoenix PCI:** Check flags in CMOS and in the BIOS data area to see if any errors have been detected during the POST. **Quadtel:** 8254 programmable interrupt timer clock test.

71: AMI Plus: Keyboard test OK. **Chips & Tech:** Test keylock. **Compaq General:** Test each RAM segment. **NCR:** Set interval timer.

72: AMI Plus: Keyboard test OK. **Chips & Tech:** Test pointing device. **Compaq General:** High order address test. **HP:** Check for configuration errors. **NCR:** Configure and test parallel interface. **Phoenix 4.0:** Check for configuration errors. **Phoenix 4.0 Release 6.0:** Check for configuration errors. **Phoenix PCI:** Check status bits for configuration errors. **Quadtel:** MC 146818 real time clock test.

73: AMI Plus: Keyboard global data initialize (8042). **AWARD Version 6.0:** Enter AWDFLASH.EXE if: AWDFLASH.EXE is found in floppy dive and ALT+F2 is pressed. **Compaq General:** Exit MEMORY TEST. **NCR:** Configure and test serial interface.

74: Acer: Serial port tested. **AMI Plus:** Floppy controller setup about to start. **Compaq General:** Parity error on bus. **HP:** Test real time clock. **NCR:** Check and execute option ROM's from C8000h to DFFFFh. **Phoenix 4.0:** Test real time clock. **Phoenix PCI:** Test real time clock if the battery has lost power. **Quadtel:** Keyboard stuck key test.

75: AMI Plus: Floppy controller setup OK. **AWARD Version 6.0:** Detect and install all IDE devices:

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HDD,LS120,ZIP,CDROM... **Compaq General:** Start protected mode test. **NCR:** Test math coprocessor if installed.

76: AMI Plus: Hard disk controller setup about to start. **Compaq General:** Prepare to enter protected mode. **HP:** Check for keyboard errors. **NCR:** Enable keyboard and RTC. **Phoenix 4.0:** Check for keyboard errors. **Phoenix 4.0 Release 6.0:** Check for keyboard errors. **Phoenix PCI:** Check status bits for keyboard errors; Errors are displayed. **Quadtel:** Initialize hardware interrupt vectors.

77: AMI Plus: Hard disk controller setup OK. **AWARD Version 6.0:** Detect serial ports and parallel ports. **Compaq General:** Test software exceptions. **DTK:** Call interrupt 19 boot loader.

78: Acer: Time of day setup. **Compaq General:** Prepare to return to real mode. **Phoenix PCI:** Check for stuck keys on the keyboard; Errors are displayed. **Quadtel:** Math coprocessor test.

79: AMI Plus: About to initialize timer data. **Compaq General:** Back in real mode-successful.

7A: AMI Plus: Verify CMOS battery power. **AWARD Version 6.0:** Detect and install coprocessor. **Compaq General:** Back in real mode-error occurred. **HP:** Test for key lock on. **Phoenix PCI:** Enable keylock. **Quadtel:** Determine serial ports available.

7B: AMI Plus: CMOS battery verification done. **Compaq General:** Exit protected mode.

7C: Acer: Optional ROM's searched for and started. **Compaq General:** Display AMI copyright. **HP:** Set up hardware interrupt vectors. **Phoenix 4.0:** Setup hardware interrupts vectors. **Phoenix 4.0 Release 6.0:** Set up hardware interrupt vectors. **Phoenix PCI:** Setup hardware interrupt vectors. **Quadtel:** Determine parallel ports available.

7D: AMI Plus: Analyze test results for memory. **Compaq General:** Entered cache controller test. **Phoenix 4.0 Release 6.0:** Initialize Intelligent System Monitoring.

7E: AMI Plus: CMOS memory size update OK. **Compaq General:** Programming memory cache. **HP:** Initialize coprocessor, if present. **Phoenix 4.0:** Test coprocessor if present. **Phoenix 4.0 Release 6.0:** Initialize coprocessor if present. **Phoenix PCI:** Test coprocessor if present. **Quadtel:** Initialize BIOS data area.

7F: AMI Plus: Check optional ROM C0000h. **AMI Win:** Enable extended NMI sources. **AWARD Version 6.0:** Switch back to text mode if full screen logo is supported: if errors occur, report errors & wait for keys, if no errors occur or F1 key is pressed continue - Clear EPA or customization logo. **Compaq General:** Copy system ROM to high RAM.

80: Acer: Math coprocessor tested. **AMI Color:** Keyboard reset. **AMI Ez-Flex:** Keyboard reset. **AMI Plus:** Keyboard sensed to enable setup. **AMI Win:** Stuck key and batch test. **Compaq General:** Start of 8042 test. **Compaq Video:** Error...color gun stuck on. **Faraday:** Error...divide overflow. **HP:** Disable onboard super I/O ports. **Phoenix 4.0:** Disable onboard I/O ports. **Phoenix 4.0 Release 6.0:** Disable onboard super I/O ports and IRQ's. **Phoenix PCI:** Detect and install RS232 ports. **Quadtel:** Determine floppy and hard disk controller.

81: AMI Color: Stuck key and batch test. **AMI Ez-Flex:** Check for stuck key and batch test. **AMI Plus:** Optional ROM control OK. **AMI Win:** Keyboard controller test. **Compaq General:** Do 8042 self test. **Faraday:** Error...single step fault. **HP:** Late POST device initialization. **Phoenix 4.0 Release 6.0:** Late POST device initialization.

82: AMI Color: 8042 keyboard controller tested. **AMI Ez-Flex:** 8042 keyboard controller tested. **AMI Plus:** Printer global data init OK. **AMI Win:** Write command byte, initialize circular buffer. **AWARD Version 6.0:** Call chipset power management hook: Recover the text font used by EPA logo (not for full screen logo), If password is set, ask for password. **Compaq General:** Check result received. **Faraday:** Error...NMI stuck on error. **HP:** Detect & install external RS-232 ports. **Phoenix 4.0:** Detect and install external RS232 ports. **Phoenix 4.0 Release 6.0:** Detect and install external RS232 ports: **Phoenix PCI:** Detect and install RS232 ports. **Quadtel:** Floppy disk test.

83: AMI Color: Lock key check. **AMI Ez-Flex:** Lock key checked. **AMI Plus:** RS-232 global data init OK. **AMI Win:** Lock key check. **AWARD Version 6.0:** Save all data in stack back to CMOS. **Compaq General:** Error result. **Faraday:** Error...breakpoint fault. **HP:** Configure non-MCD IDE controllers. **Phoenix 4.0 Release 6.0:** Configure non-MCD IDE controllers.

84: Acer: Keyboard tested. **AMI Color:** Compare memory size with CMOS. **AMI Ez-Flex:** Memory size compared to CMOS. **AMI Plus:** 80287 check/test OK. **AMI Win:** Compare memory size with CMOS. **AWARD Version 6.0:** Initialize ISA PnP boot devices. **Compaq General:** OK 8042, Init mode=5D. **Faraday:** Error...Int. 0 detect fault. **HP:** Detect & install external parallel ports. **Phoenix 4.0:** Detect and install external parallel ports. **Phoenix 4.0 Release 6.0:** Detect and install external parallel ports. **Phoenix PCI:** Detect and install parallel ports. **Quadtel:** Hard disk test.

85: AMI Color: Password/soft error check. **AMI Ez-Flex:** Password and soft error checked. **AMI Plus:** About to display soft error. **AMI Win:** Password/soft error check. **AWARD Version 6.0:** Final USB initialization; NET PC: Build SYSID structure; Switch screen back to text mode; Set up APCI table at top of memory; Invoke ISA adapter ROM's; Assign IRQ's to PCI devices; Initialize APM; Clear noise of IRQ's. **Faraday:** Error...bound error. **HP:** Initialize PnP ISA devices. **Phoenix 4.0 Release 6.0:** Initialize PC compatible PnP ISA devices.

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86: AMI Color: XCMOS/CMOS equipment check. **AMI Ez-Flex:** CMOS equipment checked performed. **AMI Plus:** Give control to system ROM E0000h. **AMI Win:** Programming before check. **Compaq General:** Start test, reset keyboard. **Faraday:** Error...Invalid opcode (BIOS or CPU fault). **HP:** Reinitialize onboard I/O ports. **Phoenix 4.0:** Re-initialize on-board I/O ports. **Phoenix 4.0 Release 6.0:** Reinitialize onboard I/O ports. **Phoenix PCI:** Initialize timeouts/key buffer/soft reset flags. **Quadtel:** External ROM scan.

87: AMI Color: CMOS setup entered. **AMI Ez-Flex:** CMOS setup performed if selected. **AMI Plus:** System ROM E0000h check over. **AMI Win:** Execute CMOS setup. **Compaq General:** Got acknowledge, read result. **Faraday:** Error...processor extension not available. **HP:** Configure motherboard configurable devices. **Phoenix 4.0 Release 6.0:** Configure motherboard configurable devices (optional).

88: Acer: System initialized. **AMI Color:** Reinitialize chipset. **AMI Ez-Flex:** Main chipset reinitialized after CMOS setup. **AMI Win:** Programming after setup. **Compaq General:** Got result, check it. **Faraday:** Error...double-exception error. **HP:** Initialize BIOS data area. **Mr. Version 3.4x:** Dead motherboard and/or BIOS ROM. **Phoenix 4.0:** Initialize BIOS data area. **Phoenix 4.0 Release 6.0:** Initialize BIOS data area. **Phoenix PCI:** Initialize timeouts/key buffer/soft reset flags. **Quadtel:** System key lock test.

89: AMI Color: Display power-on message. **AMI Ez-Flex:** Power on message displayed. **AMI Win:** Power-on display. **Compaq General:** Test for stuck keys. **Faraday:** Error...processor extended-segment error. **HP:** Enable NMI's. **Phoenix 4.0 Release 6.0:** Enable non-maskable interrupts (NMI's).

8A: AMI Color: Display wait and mouse check. **AMI Ez-Flex:** Mouse check and wait message displayed. **Compaq General:** Key seems to be stuck. **Faraday:** Error...invalid task state segment. **HP:** Initialize extended BIOS data area. **Phoenix 4.0:** Initialize extended BIOS data area. **Phoenix 4.0 Release 6.0:** Initialize extended BIOS data area. **Phoenix PCI:** Initialize extended BIOS data area and initialize the mouse. **Quadtel:** Wait for <F1> key pressed.

8B: AMI Color: Shadow any option ROM's. **AMI Ez-Flex:** Any ROM's attempted to be shadowed. **AMI Win:** Shadow main and video BIOS. **Compaq General:** Test keyboard interface. **Faraday:** Error...needed segment not present. **HP:** Test & initialize PS/2 mouse. **Phoenix 4.0 Release 6.0:** Test and initialize PS/2 mouse.

8C: Acer: System initialized **AMI Color:** Initialize XCMOS settings. **AMI Ez-Flex:** System initialized through CMOS settings. **AMI Win:** Setup options after CMOS setup. **Compaq General:** Got result, check it. **Faraday:** Error...stack segment not present. **HP:** Initialize floppy controller. **Phoenix 4.0:** Initialize floppy controller. **Phoenix 4.0 Release 6.0:** Initialize floppy controller. **Phoenix PCI:** Initialize the floppy disks and display error message if failure was detected. **Quadtel:** Final system initialization.

8D: AMI Color: Reset hard/floppy drives. **AMI Ez-Flex:** Hard drives and floppy drives reset. **AMI Win:** Initialize mouse. **Compaq General:** End of test, no errors. **Faraday:** Error...general-protection error.

8E: AMI Color: Floppy compare to CMOS. **AMI Ez-Flex:** Floppy disk setup compared to CMOS settings. **AMI Win:** Reset hard disk controller. **Faraday:** Error...general-protection error. **Phoenix PCI:** Hard disk auto type detection. **Quadtel:** Interrupt 19 boot loader.

8F: AMI Color: Floppy disk controller initialization. **AMI Ez-Flex:** Floppy controller initialized. **AMI Win:** Floppy setup. **Faraday:** Error...general-protection error. **HP:** Determine number of ATA drives. **Phoenix 4.0 Release 6.0:** Determine number of ATA drives (optional).

90: Acer: Operating system boot process started. **AMI Color:** Hard disk compare to CMOS. **AMI Ez-Flex:** Hard disks setup compared to CMOS settings. **Chips & Tech:** Setup RAM. **Compaq General:** Start of CMOS test. **Compaq Video:** Error...color gun stuck off. **Faraday:** Error...processor-extension error. **HP:** Initialize hard disk controllers. **Phoenix 4.0:** Initialize hard disk controller. **Phoenix 4.0 Release 6.0:** Initialize hard disk controllers. **Phoenix PCI:** If the CMOS RAM is valid and intact and fixed disks are defined, call the fixed disk initialization routine to initialize the fixed disk system and take over the appropriate interrupt vectors.

91: AMI Color: Hard disk controller initialization. **AMI Ez-Flex:** Hard disk controller initialized. **AMI Win:** Hard disk setup. **Chips & Tech:** Calculate CPU speed. **Compaq General:** CMOS seems to be OK. **Faraday:** Error...spurious interrupts. **HP:** Initialize local BUS HD controllers. **Phoenix 4.0:** Initialize local bus hard disk controller. **Phoenix 4.0 Release 6.0:** Initialize local bus hard disk controllers.

92: AMI Color: BIOS data table check. **AMI Ez-Flex:** BIOS data table checked. **Chips & Tech:** Check configuration. **Compaq General:** Error on CMOS read, write test. **Faraday:** Error...spurious interrupts. **HP:** Jump to user patch 2. **Phoenix 4.0:** Jump to User Patch 2. **Phoenix 4.0 Release 6.0:** Jump to User Patch 2. **Phoenix PCI:** Disable gate A20 address line.

93: AMI Color: BIOS data check halt halfway. **AMI Ez-Flex:** BIOS data table check complete. **AWARD Version 6.0:** Read HDD boot sector information for Trend Anti-Virus code. **Chips & Tech:** Initialize BIOS. **Compaq General:** Start of DMA controller test. **Faraday:** Error...spurious interrupts. **HP:** Build MPTABLE for multiprocessor boards. **Phoenix 4.0 Release 6.0:** Build MPTABLE for multi processor boards.

94: Acer: Shutdown condition 5. **AMI Color:** Set memory size. **AMI Ez-Flex:** Memory size set. **AMI Win:** Base/extended memory size. **AWARD Version 6.0:** Enable L2 cache; Program boot up speed; Chipset final initialization; Power management final initialization; Clear screen and display summary table; Program K^ write allocation; Program P6 class write combining. **Chips & Tech:** POST Bootstrap. **Compaq General:** Page registers seem to be OK. **Faraday:** Error...spurious interrupts. **HP:** Disable A-20 line. **Phoenix 4.0:**

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Disable A20 address line. **Phoenix PCI:** Disable gate A20 address line.

95: AMI Color: Verify display memory. **AMI Ez-Flex:** Display memory verified. **AMI Win:** Init. PCI/VLB BUS optional ROM's from C800. **AWARD Version 6.0:** Program daylight saving; Update keyboard LED and typematic rate. **Chips & Tech:** Reset IC's. **Compaq General:** DMA controller is OK. **Faraday:** Error...spurious interrupts. **HP:** Install CD-ROM for boot. **Phoenix 4.0 Release 6.0:** Install CD ROM for boot.

96: AMI Color: Clear all Interrupts. **AMI Ez-Flex:** All Interrupts cleared. **AMI Win:** Initialize before C800 optional ROM control. **AWARD Version 6.0:** Build MP table; Build and update ESCD; Set CMOS century to 20h or 19h; Load CMOS time into DOS timer tick; Build MSIRQ routing table. **Chips & Tech:** PEAK: System board POS. NEAT/OC8291 ELEAT: Test/initialize cache RAM and controller. **Compaq General:** 8237 initialization is complete. **Faraday:** Error...spurious interrupts. **HP:** Clear huge ES segment register. **Phoenix 4.0:** Clear huge ES segment register. **Phoenix 4.0 Release 6.0:** Clear huge ES segment register. **Phoenix PCI:** Scan for ROM BIOS extensions.

97: AMI Color: Optional ROM's check. **AMI Ez-Flex:** Optional ROM's checked for. **AMI Win:** Control to optional ROM. **Chips & Tech:** VGA power on diagnostics and setup. **Compaq General:** Start of NCA RAM test. **Faraday:** Error...spurious interrupts. **HP:** Fix up multiprocessor table. **Phoenix 4.0 Release 6.0:** Fix up multi processor table.

98: Acer: Shutdown condition A. **AMI Color:** Clear all Interrupts. **AMI Ez-Flex:** All Interrupts cleared. **AMI Win:** Processing after optional ROM control. **Chips & Tech:** Adapter BIOS. **Faraday:** Error...spurious interrupts. **HP:** Search for options ROM's. **Phoenix 4.0:** Search for option ROM's. **Phoenix 4.0 Release 6.0:** Search for option ROM's. **Phoenix PCI:** Scan for ROM BIOS extensions.

99: AMI Color: Setup timer data/RS232 base **AMI Ez-Flex:** Timer data setup. **AMI Win:** Setup timer data area/printer base address. **Chips & Tech:** Re-initialize DDNIL bits. **Faraday:** Error...spurious interrupts. **HP:** Check for SMART drive. **Phoenix 4.0 Release 6.0:** Check for SMART drive (optional).

9A: AMI Color: RS232 test; Locate and test serial ports. **AMI Ez-Flex:** Serial ports checked for. **AMI Win:** Set RS-232 base address. **Faraday:** Error...spurious interrupts. **HP:** Shadow ROM option. **Phoenix 4.0:** Shadow option ROM's. **Phoenix 4.0 Release 6.0:** Shadow option ROM's.

9B: AMI Color: Clear all Interrupts. **AMI Ez-Flex:** All Interrupts cleared. **AMI Win:** Initialize before NPU test. **Faraday:** Error...spurious interrupts.

9C: Acer: Shutdown condition B. **AMI Color:** NPU test. **AMI Ez-Flex:** Math coprocessor checked. **AMI Win:** NPU initialization. **Faraday:** Error...spurious interrupts. **HP:** Set up power management. **Phoenix 4.0:** Setup power management. **Phoenix 4.0 Release 6.0:** Set up power management.

9D: AMI Color: Clear all Interrupts. **AMI Ez-Flex:** All Interrupts cleared. **AMI Win:** Initialization after NPU test. **Faraday:** Error...spurious interrupts. **Phoenix 4.0 Release 6.0:** Initialize security engine (optional).

9E: AMI Color: Extended keyboard check. **AMI Ez-Flex:** Extended keyboard checked. **AMI Win:** Check extended KB, KB ID and num-lock. **Faraday:** Error...spurious interrupts. **HP:** Enable hardware interrupts. **Phoenix 4.0:** Enable hardware interrupts. **Phoenix 4.0 Release 6.0:** Enable hardware interrupts. **Phoenix PCI:** Enable hardware interrupts.

9F: AMI Color: Set numlock. **AMI Ez-Flex:** NumLock set on keyboard. **AMI Win:** Issue keyboard ID command. **Faraday:** Error...spurious interrupts. **HP:** Determine number of ATA & SCSI drives. **Phoenix 4.0 Release 6.0:** Determine number of ATA and SCSI drives.

A0: AMI Color: Keyboard reset. **AMI Ez-Flex:** Keyboard reset. **AMI Win:** Reset keyboard ID flag. **Chips & Tech:** Exception 0. **Compaq General:** Start of diskette tests. **Compaq Video:** Error...video memory failure. **HP:** Set time of day. **Phoenix 4.0:** Set time of day. **Phoenix 4.0 Release 6.0:** Set time of day. **Phoenix PCI:** Set time of day.

A1: AMI Color: Cache memory test. **AMI Ez-Flex:** Cache memory size tested. **AMI Win:** Cache memory test. **Chips & Tech:** Exception 1. **Compaq General:** FDC reset active (3F2h Bit 2).

A2: AMI Color: Display any soft errors. **AMI Ez-Flex:** Display any soft errors. **AMI Win:** Display and soft errors. **Chips & Tech:** Exception 2. **Compaq General:** FDC reset inactive (3F2h Bit 2). **HP:** Check key lock. **Phoenix 4.0:** Check key lock. **Phoenix 4.0 Release 6.0:** Check key lock. **Phoenix PCI:** Setup numlock indicator.

A3: AMI Color: Set typematic rate. **AMI Ez-Flex:** Typematic rate set. **Compaq General:** FDC motor on. **Chips & Tech:** Exception 3.

A4: AMI Color: Set memory wait states. **AMI Ez-Flex:** Memory wait states set. **AMI Win:** Program memory wait states. **Chips & Tech:** Exception 4. **Compaq General:** FDC time-out error. **HP:** Initialize typematic rate. **Phoenix 4.0 Release 6.0:** Initialize typematic rate. **Phoenix PCI:** Initialize typematic rate.

A5: AMI Color: Clear screen. **AMI Ez-Flex:** Display is cleared. **AMI Win:** Clear screen, enable parity NMI. **Chips & Tech:** Exception 5. **Compaq General:** FDC failed reset.

A6: AMI Color: Enable parity/NMI. **AMI Ez-Flex:** Parity and NMI enabled. **Chips & Tech:** Exception 6. **Phoenix PCI:** Initialize hard disk autoparking. **Compaq General:** FDC passed reset.

A7: AMI Color: Clear all Interrupts. **AMI Ez-Flex:** All Interrupts cleared. **AMI Win:** Init. needed before control to E000 ROM. **Chips & Tech:** Exception 7.

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A8: AMI Color: Control to ROM at E0000. **AMI Ez-Flex:** System control is turned over to ROM at E0000. **AMI Win:** Control to E000 ROM. **Chips & Tech:** Exception 8. **Compaq General:** Start to determine drive type. **HP:** Erase F2 prompt. **Phoenix 4.0:** Erase F2 prompt. **Phoenix 4.0 Release 6.0:** Erase F2 prompt. **Phoenix PCI:** Erase F2 prompt.

A9: AMI Color: Clear all Interrupts. **AMI Ez-Flex:** All Interrupts cleared. **AMI Win:** Init. needed after control to E000 ROM. **Chips & Tech:** Exception 9. **Compaq General:** Seek operation initialized.

AA: AMI Color: Display configuration. **AMI Ez-Flex:** Displayed configuration. **AMI Win:** Display system configuration. **Chips & Tech:** Exception A. **Compaq General:** Waiting for FDC seek status. **HP:** Scan for F2 keystroke. **Phoenix 4.0:** Scan for F2 keystroke. **Phoenix 4.0 Release 6.0:** Scan for F2 key stroke. **Phoenix PCI:** Scan for F2 keystroke.

AB: Chips & Tech: Exception B.

AC: Chips & Tech: Exception C. **HP:** Enter SETUP. **Phoenix 4.0:** Enter setup. **Phoenix 4.0 Release 6.0:** Enter setup. **Phoenix PCI:** Check to see if SETUP should executed.

AD: Chips & Tech: Exception D.

AE: HP: Clear IN-POST flag. **Phoenix 4.0:** Clear in-POST flag. **Phoenix 4.0 Release 6.0:** Clear boot flag. **Phoenix PCI:** Clear ConfigFailedBit and InPostBit in CMOS.

AF: Compaq General: Diskette tests complete.

B0: AMI Win: Uncompressed SETUP code for hot-key. **AWARD Elite:** Spurious interrupt occurred in protect mode. Check mismatch memory. **AWARD ISA/EISA:** NMI in protected. **AWARD PnP:** Unexpected interrupt in protected mode. **Compaq General:** Start of fixed drive tests. **HP:** Check for errors. **Phoenix 4.0:** Check for errors. **Phoenix 4.0 Release 6.0:** Check for errors. **Phoenix PCI:** Check for POST errors. **Quadtel:** Unexpected interrupt before or after boot up.

B1: AMI Win: Copy any code to specific area. **AWARD Elite:** Unclaimed NMI. **AWARD ISA/EISA:** Disable NMI. **AWARD PnP:** Unclaimed NMI occurred. **Compaq General:** Combo board not found-exit. **Phoenix 4.0 Release 6.0:** Inform RomPilot about the end of POST.

B2: Compaq General: Combo controller failed-exit. **HP:** POST done, prepare for boot. **Phoenix 4.0:** POST done; prepare to boot operating system. **Phoenix 4.0 Release 6.0:** POST done - prepare to boot operating system. **Phoenix PCI:** Set/clear status bits to reflect POST complete.

B3: Compaq General: Testing drive 1.

B4: Compaq General: Testing drive 2. **HP:** One short beep before boot. **Phoenix 4.0:** One beep. **Phoenix 4.0 Release 6.0:** One short beep. **Phoenix PCI:** One beep.

B5: Compaq General: Drive error (error condition). **HP:** Terminate quiet boot. **Phoenix 4.0 Release 6.0:** Terminate Quiet Boot (optional).

B6: Compaq General: Drive failed (failed to respond). **HP:** Check password (optional). **Phoenix 4.0:** Check password (optional). **Phoenix 4.0 Release 6.0:** Check password. **Phoenix PCI:** Check for password before boot.

B7: Compaq General: No fixed drives-exit. **Phoenix 4.0 Release 6.0:** Initialize ACPI BIOS.

B8: Compaq General: Fixed drive tests complete. **HP:** Clear global descriptor table. **Phoenix 4.0:** Clear global descriptor table. **Phoenix PCI:** Clear global descriptor table.

B9: Compaq General: Attempt to boot diskette. **HP:** Clean up all graphics. **Phoenix 4.0 Release 6.0:** Prepare boot.

BA: Compaq General: Attempt to boot fixed drive. **HP:** Initialize DMI parameters. **Phoenix 4.0 Release 6.0:** Initialize DMI parameters. **Phoenix PCI:** Initialize the screen saver.

BB: Compaq General: Boot attempt failed FD/HD **HP:** Initialize PnP option ROM's **Phoenix 4.0 Release 6.0:** Initialize PnP option ROM's

BC: Compaq General: Jump to boot record. **HP:** Clear parity checkers. **Phoenix 4.0:** Clear parity checkers. **Phoenix 4.0 Release 6.0:** Clear parity checkers. **Phoenix PCI:** Clear parity error latch.

BD: Compaq General: Drive error, retry booting. **HP:** Display multi boot menu. **Phoenix 4.0 Release 6.0:** Display multiboot menu.

BE: AT&T: Program default values into chipset according to the MODBINABLE Chipset Default Table. **AWARD Elite:** Chipset default initialization; Program chipset registers and power-on BIOS defaults. **AWARD ISA/EISA:** Chipset default initialization. **AWARD PnP:** Program defaults into chipset. **Compaq General:** Weitek coprocessor test. **HP:** Clear screen optional. **Phoenix 4.0:** Clear screen (optional). **Phoenix 4.0 Release 6.0:** Clear screen. **Phoenix PCI:** Clear screen.

BF: AT&T: Program chipset values according to setup. **AWARD Elite:** Chipset initialization; Reserved. **AWARD ISA/EISA:** Chipset program; initialization of system specific chipsets. **AWARD PnP:** Program remaining chipset values. **HP:** Check virus and backup reminders. **Phoenix 4.0:** Check virus and backup reminders. **Phoenix 4.0 Release 6.0:** Check virus and backup reminders.

C0: AT&T: Turn off OEM specific cache; Initialize standard devices: DMA controller (8237), Programmable interrupt controller (8259), Programmable interval timer (8254), RTC chip. **AWARD Elite:** Turn off chipset cache. **AWARD ISA/EISA:** Cache on/off. **AWARD PnP:** Init. all standard devices with defaults.

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AWARD Version 6.0: Early chipset initialization: Disable shadow RAM, L2 cache (socket 7 and below), program basic chipset registers. **Chips & Tech:** System board memory failure. **HP:** Try to boot with Int 19. **Phoenix 4.0:** Try to boot interrupt 19. **Phoenix 4.0 Release 6.0:** Try to boot with interrupt 19. **Phoenix PCI:** Try to boot with interrupt 19.

C1: AT&T: Auto detection on onboard DRAM & cache. **AWARD Elite:** Memory presence test; OEM specific, test the size of on-board memory. **AWARD ISA/EISA:** Memory size checked. **AWARD PnP:** Auto detect on-board DRAM & cache. **AWARD Version 6.0:** Detect memory: Auto detection of DRAM size, type and ECC, auto detection of L2 cache (socket 7 and below). **Chips & Tech:** I/O channel check activated. **HP:** Initialize POST error manager. **Phoenix 4.0 Release 6.0:** Initialize POST Error Manager (PEM).

C2: AMI Win: Disable NMI, power-on delay. **AWARD ISA/EISA:** Base 256K tested. **Chips & Tech:** Watchdog timer timeout. **HP:** Initialize error logging. **Phoenix 4.0 Release 6.0:** Initialize error logging.

C3: AT&T: Test first 256K DRAM. **AWARD ISA/EISA:** DRAM page select tested. **AWARD PnP:** Test first 26K DRAM. **AWARD Version 6.0:** Expand compressed BIOS code to DRAM. **Chips & Tech:** Bus timer timeout. **HP:** Initialize error display function. **Phoenix 4.0 Release 6.0:** Initialize error display function.

C4: AWARD ISA/EISA: Video switch. **HP:** Initialize system error handler. **Phoenix 4.0 Release 6.0:** Initialize system error handler.

C5: AMI Win: Enable ROM, disable cache. **AT&T:** Copy the BIOS from ROM into E000FFFF shadow RAM. **AWARD Elite:** Early shadow, OEM specific, early shadow enable for fast boot. **AWARD ISA/EISA:** Shadow RAM tested. **AWARD PnP:** Copy ROM BIOS to E000-FFFF. **AWARD Version 6.0:** Call chipset hook to copy BIOS back to E000 & F000 shadow RAM. **Phoenix 4.0 Release 6.0:** PnP dual CMOS (optional).

C6: AMI Win: ROM BIOS checksum. **AWARD Elite:** Cache presence test; External cache-size detection test. **AWARD ISA/EISA:** Cache program; configure cache memory. **Phoenix 4.0 Release 6.0:** Initialize notebook docking (optional).

C7: AMI Win: CMOS shutdown register test. **Phoenix 4.0 Release 6.0:** Initialize notebook docking late.

C8: AMI Win: CMOS shutdown. **AWARD ISA/EISA:** Speed switch. **Phoenix 4.0 Release 6.0:** Force check (optional).

C9: AWARD ISA/EISA: Shadow RAM tested. **Phoenix 4.0 Release 6.0:** Extended checksum (optional).

CA: AMI Win: Initialize CMOS date and time. **AWARD ISA/EISA:** OEM chipset initialized. **Phoenix 4.0 Release 6.0:** Redirect Int 15h to enable remote keyboard.

CB: AMI Win: Initialization before keyboard batch. **Phoenix 4.0 Release 6.0:** Redirect Int 13 to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk.

CC: Olivetti: Unexpected processor exception occurred. **Phoenix 4.0 Release 6.0:** Redirect Int 10h to enable remote serial video.

CD: AMI Win: BAT command to keyboard controller. **Phoenix 4.0 Release 6.0:** Re-map I/O and memory for PCMCIA.

CE: AMI Win: Installation after keyboard controller batch. **Phoenix 4.0 Release 6.0:** Initialize digitizer and dispaly message.

CF: AMI Win: Write keyboard command byte. **AWARD Version 6.0:** Test CMOS read/write functionality.

D0: Phoenix 4.0: Interrupt handler error. **Phoenix PCI:** If an interrupt occurs before interrupts vectors have been initialized, interrupt handler will check if 8259 programmable interrupt timer caused the interrupt and which one; If error is unknown, InterruptFlag will be FF, otherwise, it will hold the IRQ number that occurred. **Compaq General:** Entry to clear memory routine.

D1: AMI Win: Check for <INS> key command. **Compaq General:** Ready to go to protected mode.

D2: AMI Win: Disable DMA and Interrupt controllers. **Compaq General:** Ready to clear extended memory. **Phoenix 4.0:** Unknown interrupt error. **Phoenix 4.0 Release 6.0:** Unknown interrupt. **Phoenix PCI:** If an interrupt occurs before interrupts vectors have been initialized, interrupt handler will check if 8259 programmable interrupt timer caused the interrupt and which one; If error is unknown, InterruptFlag will be FF, otherwise, it will hold the IRQ number that occurred.

D3: AMI Win: Chipset initialization/auto detect memory. **Compaq General:** Ready to reset back to real mode.

D4: AMI Win: Uncompressed RUNTIME code. **Compaq General:** Back in real mode. **Phoenix 4.0:** Pending interrupt error. **Phoenix PCI:** Clear pending timer and keyboard interrupts and transfer control to the double word address located at RomCheck.

D5: AMI Win: RUNTIME code uncompressed. **Compaq General:** Clear base memory.

D6: Phoenix 4.0: Initialize option ROM error. **Phoenix PCI:** Return from extended block move.

D8: Phoenix 4.0: Shutdown error. **Phoenix PCI:** Return from extended block move.

DA: Phoenix 4.0: Extended block move. **Phoenix PCI:** Return from extended block move.

DC: Phoenix 4.0: Shutdown 10 error.

DD: AMI Win: Control to shadow RAM at F000: F000. **Compaq General:** Built-in self-test failed. **Olivetti:** Save DDNIL status.

E0: Compaq General: Ready to replace E000 ROM. **HP:** Initialize the chipset. **Phoenix 4.0 Release 6.0:** Initialize the chipset.

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E1: AWARD Elite: Setup pages. **Compaq General:** Completed E000 ROM replacement. **HP:** Initialize the bridge. **Phoenix 4.0 Release 6.0:** Initialize the bridge.
E2: AWARD Elite: Setup pages. **Compaq General:** Ready to replace EGA ROM. **HP:** Initialize the processor. **Phoenix 4.0:** Initialize the chipset. **Phoenix 4.0 Release 6.0:** Initialize the CPU.
E3: AWARD Elite: Setup pages. **Compaq General:** Completes EGA ROM replacement. **HP:** Initialize system timer. **Phoenix 4.0:** Initialize refresh counter. **Phoenix 4.0 Release 6.0:** Initialize the system timer.
E4: AWARD Elite: Setup pages. **HP:** Initialize system I/O. **Phoenix 4.0:** Check for forced flash. **Phoenix 4.0 Release 6.0:** Initialize system I/O.
E5: AWARD Elite: Setup pages. **HP:** Check force recovery boot. **Phoenix 4.0:** Check HW status of ROM. **Phoenix 4.0 Release 6.0:** Check force recovery boot.
E6: AWARD Elite: Setup pages. **HP:** Checksum BIOS ROM. **Phoenix 4.0:** BIOS ROM is ok. **Phoenix 4.0 Release 6.0:** Checksum BIOS ROM.
E7: AWARD Elite: Setup pages. **HP:** Got to BIOS. **Phoenix 4.0:** Do a complete RAM test. **Phoenix 4.0 Release 6.0:** Go to BIOS.
E8: AWARD Elite: Setup pages. **HP:** Set huge segment. **Phoenix 4.0:** Do OEM initialization. **Phoenix 4.0 Release 6.0:** Set Huge Segment.
E9: AWARD Elite: Setup pages. **HP:** Initialize multiprocessor. **Phoenix 4.0:** Initialize interrupt controller. **Phoenix 4.0 Release 6.0:** Initialize Multi Processor.
EA: AWARD Elite: Setup pages. **HP:** Initialize OEM special code. **Phoenix 4.0:** Read in bootstrap code. **Phoenix 4.0 Release 6.0:** Initialize OEM special code.
EB: AWARD Elite: Setup pages. **HP:** Initialize PIC & DMA. **Phoenix 4.0:** Initialize all vectors. **Phoenix 4.0 Release 6.0:** Initialize PIC and DMA.
EC: AWARD Elite: Setup pages. **HP:** Initialize memory type. **Phoenix 4.0:** Boot the flash program. **Phoenix 4.0 Release 6.0:** Initialize Memory type.
ED: AWARD Elite: Setup pages. **HP:** Initialize memory type. **Phoenix 4.0:** Initialize the boot device. **Phoenix 4.0 Release 6.0:** Initialize Memory size.
EE: AWARD Elite: Setup pages. **HP:** Shadow boot block. **Olivetti:** NMI handler shutdown. **Phoenix 4.0:** Boot code was read ok. **Phoenix 4.0 Release 6.0:** Shadow Boot Block.
EF: AWARD Elite: Setup pages. **HP:** System memory test. **Phoenix 4.0 Release 6.0:** System memory test.
F0: Compaq Video: Error...equipment failure. **HP:** Initialize interrupt vectors. **NCR:** Display and logged errors. **Phoenix 4.0 Release 6.0:** Initialize interrupt vectors.
F1: HP: Initialize runtime clock. **NCR:** Test system code at E0000h and copy video ROM to shadow memory. **Phoenix 4.0 Release 6.0:** Initialize Run Time Clock.
F2: HP: Initialize video. **NCR:** Call interrupt 19 boot loader. **Phoenix 4.0 Release 6.0:** Initialize video.
F3: Faraday: Error...CPU protected-mode fault. **HP:** Initialize beeper. **NCR:** Got to setup if F1 was pressed. **Phoenix 4.0 Release 6.0:** Initialize System Management Mode.
F4: HP: Initialize BOOT. **NCR:** Display speed setting. **Phoenix 4.0 Release 6.0:** Output one beep.
F5: HP: Clear huge segment. **NCR:** Initialize counter 2 for speed testing. **Phoenix 4.0 Release 6.0:** Clear Huge Segment.
F6: HP: Boot to mini-DOS. **NCR:** Test base memory. **Phoenix 4.0 Release 6.0:** Boot to mini DOS.
F7: HP: Boot to full DOS. **NCR:** Test extended memory. **Phoenix 4.0 Release 6.0:** Boot to Full DOS.
F9: Faraday: Error...virtual-block move error.
FF: AMI Color: Call to Interrupt 19 boot loader. **AMI Plus:** Call to Interrupt 19 for boot loader. **AT&T:** Boot. **AWARD Elite:** Boot loader. **AWARD ISA/EISA:** Boot from Int 19. **AWARD PnP:** System booting. **AWARD Version 6.0:** Boot attempt (INT 19h). **Compaq Video:** Video POST complete. **Mr. Version 3.4x:** BIOS POST finished. **Olivetti:** Call interrupt 19 boot loader.

G. Description of beep code

(1)AMI BIOS beep codes (fatal error)

1 beep	DRAM Refreshing Fails. Try to reseat the memory first. If the error still occurs, replace the memory with known good chips.
2 beeps	Parity Error in First 64K RAM. Try to reseat the memory first. If the error still occurs, replace the memory with known good chips.
3 beeps	Base 64K RAM Failure. Try to reseat the memory first. If the error still occurs, replace the memory with known good chips.
4 beeps	System timer fails.
5 beeps	Process fails.
6 beeps	Keyboard Controller 8042 - Gate A20 is Error. Try to reseat the keyboard controller chip. If the error still occurs, replace the keyboard chip. If the error persists, check parts of the system relating to the keyboard, e.g. try another keyboard, check to see if the system has a keyboard fuse.
7 beeps	Processor Virtual Mode Exception Interrupt Error.

8 beeps Display Memory Read/Write Test Failure (Non-fatal). Replace the video card or the memory on the video card.

9 beeps ROM BIOS Checksum (32KB at F800: 0) Failed. It is not likely that this error can be corrected by reseating the chips. Consult the motherboard supplier or an AMI product distributor for replacement part(s).

10 beeps CMOS Shutdown Register Read/Write Error.

11 beeps Cache memory error.

(2). AMI BIOS beep codes (Non-fatal error)

2 short POST Failure - One or more of the hardware tests has failed

1 long 2 short An error was encountered in the video BIOS ROM, or a horizontal retracing failure has been encountered

1 long 3 short Conventional/Extended memory failure

1 long 8 short Display/Retrace test failed

(3). Award BIOS beep codes

1 short No error during POST

2 short Any Non-fatal error, enter CMOS SETUP to reset

1 long 1 short RAM or motherboard error

1 long 2 short Video Error, Cannot Initialize Screen to Display Any Information

1 long 3 short Keyboard Controller error

1 long 9 short Flash RAM/EPROM (which on the motherboard) error. (BIOS error)

Long beep Memory bank is not plugged well, or broken.

(4).Phoenix BIOS beep codes

Beep Code	Description / What to Check	Beep Code	Description / What to Check
1-1-1-3	Verify Real Mode.	1-1-2-1	Get CPU type.
1-1-2-3	Initialize system hardware.	1-1-3-1	Initialize chipset registers with initial POST values.
1-1-3-2	Set in POST flag.	1-1-3-3	Initialize CPU registers.
1-1-4-1	Initialize cache to initial POST values.	1-1-4-3	Initialize I/O.
1-2-1-1	Initialize Power Management.	1-2-1-2	Load alternate registers with initial POST values.
1-2-1-3	Jump to User Patch 0.	1-2-2-1	Initialize keyboard controller.
1-2-2-3	BIOS ROM checksum.	1-2-3-1	8254 timer initialization.
1-2-3-3	8237 DMA controller initialization.	1-2-4-1	Reset Programmable Interrupt Controller.
1-3-1-1	Test DRAM refresh.	1-3-1-3	Test 8742 Keyboard Controller.
1-3-2-1	Set ES segment to register to 4 GB.	1-3-3-1	28 Autosize DRAM.
1-3-3-3	Clear 512K base RAM.	1-3-4-1	Test 512K base address line.
1-3-4-3	Test 512K base memory.	1-4-1-3	Test CPU bus-clock frequency.
1-4-2-4	Reinitialize the chipset.	1-4-3-1	Shadow system BIOS ROM.
1-4-3-2	Reinitialize the cache.	1-4-3-3	Autosize cache.
1-4-4-1	Configure advanced chipset registers.	1-4-4-2	Load alternate registers with CMOS values.
2-1-1-1	Set Initial CPU speed.	2-1-1-3	Initialize interrupt vectors.
2-1-2-1	Initialize BIOS interrupts.	2-1-2-3	Check ROM copyright notice.
2-1-2-4	Initialize manager for PCI Options ROMs.	2-1-3-1	Check video configuration against CMOS.
2-1-3-2	Initialize PCI bus and devices.	2-1-3-3	Initialize all video adapters in system.
2-1-4-1	Shadow video BIOS ROM.	2-1-4-3	Display copyright notice.
2-2-1-1	Display CPU type and speed.	2-2-1-3	Test keyboard.
2-2-2-1	Set key click if enabled.	2-2-2-3	56 Enable keyboard.
2-2-3-1	Test for unexpected interrupts.	2-2-3-3	Display prompt "Press F2 to enter SETUP".
2-2-4-1	Test RAM between 512 and 640k.	2-3-1-1	Test expanded memory.
2-3-1-3	Test extended memory address line.	2-3-2-1	Jump to User Patch 1.
2-3-2-3	Configure advanced cache registers.	2-3-3-1	Enable external and CPU caches.
2-3-3-3	Display external cache size.	2-3-4-1	Display shadow message.
2-3-4-3	Display non-disposable segments.	2-4-1-1	Display error messages.
2-4-1-3	Check for configuration errors.	2-4-2-1	Test real-time clock.
2-4-2-3	Check for keyboard errors	2-4-4-1	Set up hardware interrupts vectors.
2-4-4-3	Test coprocessor if present.	3-1-1-1	Disable onboard I/O ports.
3-1-1-3	Detect and install external RS232 ports.	3-1-2-1	Detect and install external parallel ports.
3-1-2-3	Re-initialize onboard I/O ports.	3-1-3-1	Initialize BIOS Data Area.
3-1-3-3	Initialize Extended BIOS Data Area.	3-1-4-1	Initialize floppy controller.
3-2-1-1	Initialize hard-disk controller.	3-2-1-2	Initialize local-bus hard-disk controller.
3-2-1-3	Jump to User Patch 2.	3-2-2-1	Disable A20 address line.
3-2-2-3	Clear huge ES segment register.	3-2-3-1	Search for option ROMs.
3-2-3-3	Shadow option ROMs.	3-2-4-1	Set up Power Management.

3-2-4-3	Enable hardware interrupts.
3-3-1-3	Check key lock.
3-3-3-3	Scan for F2 key stroke.
3-3-4-3	Clear in-POST flag.
3-4-1-3	POST done--prepare to boot operating system.
3-4-2-3	Check password (optional).
3-4-4-1	Clear parity checkers.
3-4-4-4	Check virus and backup reminders.
4-2-1-1	Interrupt handler error.
4-2-2-1	Pending interrupt error.
4-2-3-1	Shutdown error.
4-2-4-1	Shutdown 10 error.
4-3-1-4	Initialize refresh counter.
4-3-2-2	Check HW status of ROM.
4-3-2-4	Do a complete RAM test.
4-3-3-2	Initialize interrupt controller.
4-3-3-4	Initialize all vectors.
4-3-4-2	Initialize the boot device.
3-3-1-1	Set time of day.
3-3-3-1	Erase F2 prompt.
3-3-4-1	Enter SETUP.
3-4-1-1	Check for errors
3-4-2-1	One beep.
3-4-3-1	Clear global descriptor table.
3-4-4-3	Clear screen (optional).
4-1-1-1	Try to boot with INT 19.
4-2-1-3	Unknown interrupt error.
4-2-2-3	Initialize option ROM error.
4-2-3-3	Extended Block Move.
4-3-1-3	Initialize the chipset.
4-3-2-1	Check for Forced Flash.
4-3-2-3	BIOS ROM is OK.
4-3-3-1	Do OEM initialization.
4-3-3-3	Read in bootstrap code.
4-3-4-1	Boot the Flash program.
4-3-4-3	Boot code was read OK.

(5). IBM BIOS beep codes

Beep Code	Description
No Beeps	No Power, Loose Card, or Short.
1 Short Beep	Normal POST, computer is ok.
2 Short Beep	POST error, review screen for error code.
Continuous Beep	No Power, Loose Card, or Short.
Repeating Short Beep	No Power, Loose Card, or Short.
One Long and one Short Beep	Motherboard issue.
One Long and Two short Beeps	Video (Mono/CGA Display Circuitry) issue.
One Long and Three Short Beeps.	Video (EGA) Display Circuitry.
Three Long Beeps	Keyboard / Keyboard card error.
One Beep, Black or Incorrect Display	Video Display Circuitry.

H. Answers to frequently-asked questions

NOTE: 1. Don't go against the rules of mainboard quality guaranty If the mainboard is under guaranty.
2. Resolve all errors only when the power is off.

Error	Description	Solutions
Memory bank	Memory bank is bad	Replace it and try again
	Pins of memory bank are dirty	Clean them with student eraser and try again.
	It is not matched with the other banks.	Replace it with the right memory bank.
	Plugged in the wrong direction	Insert it properly
Memory slot or extended slot	The slot is dirty or There is something in slot.	Clean it
	Metallic spring slice in the slot is out of shape or ruptured.	Refit its shape or replace it.
	Metallic spring slice in the slot is rusty or it has gone moldy.	Wash it with the pure alcohol, Inserts it and pull it out frequently to promote capability of tangency after it is dry.

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CPU	CPU is broken	Replace it. (Touch it to check if it does generate heat or is overheated)
	The jumper setup or CMOS setup of CPU is error.	Check the jumper setup and CMOS setup such as voltage and frequency of CPU
	CPU pins are dirty.	Clean the CPU. insert it and pull it out for several times in order to inosculate well.
	CPU is not plugged well.	Check the CPU pins and plug CPU carefully.
Error of PC Analyzer or it is plugged by error	The pins are dirty	Clean them with student eraser, insert PC Analyzer and pull it out many times to promote capability of tangency.
	The PC Analyzer is plugged in wrong slot	Distinguish carefully between ISA slot and PCI slot
	It is plugged in the wrong direction.	Make sure the component side of PC Analyzer should face to the power supply when inert it in ISA slot.
	The PC Analyzer is bad	Get in touch with your dealer or Manufacturer.
Power on, the code is not varying	The mainboard has not been running	Check the power , CPU jumper and so on.
	There is no code output to the bus slot in which the PC Analyzer insert	Try the other slot. (See "must-reads of users" on page 1)
POST codes stopped midway	computer error	It is purpose of PC Analyzer. According to its meanings of POST code You can troubleshoot.
	The mainboard stopped sending the POST codes to bus slot and send them to video display	Connect to the monitor, according to the message on the screen to check the error, then try again.

Situations	Causes	Resolvent
The indicator lights is lit, but the digital screen panel is not lit or 1bit,2 bits or 3 bits of digital screen panel is lit.	The PC Analyzer may be loose so that they cannot inosculate well.	Power off, remove PC Analyzer and clean the pins and connector with eraser and try again.
	The slot or connector may be dirty	Clean the dirt in the slot, and try to insert and remove the PC Analyzer frequently so as to wipe out the dirt in the slot and inosculate well.
	the interval of restart is too short	Wait for no less than 8 seconds after you power off the computer and Restart it.
The function switch doesn't work	Press the switch too gently.	Press the switch with right force
	Your hands may touch the pins of function switch and result in faradism that make the PC Analyzer program doesn't scan the switch.	Stick a insulating slide or paper to the switch pins at the back of PC Analyzer.
	While you press the switch PC Analyzer may be loose.	Press the switch as carefully as you can to keep PC Analyzer inosculated well in the slot.
The function switch works, but it doesn't operate well.	The time you hold the switch is incorrect (0.8 second is the longer one, 0.4 second is the shorter one.)	Hold the switch for proper time: press and hold the switch for proper time and then leave it off as soon as the PC Analyzer responds.
	The switch is bad	Contact your dealer to change the switch

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